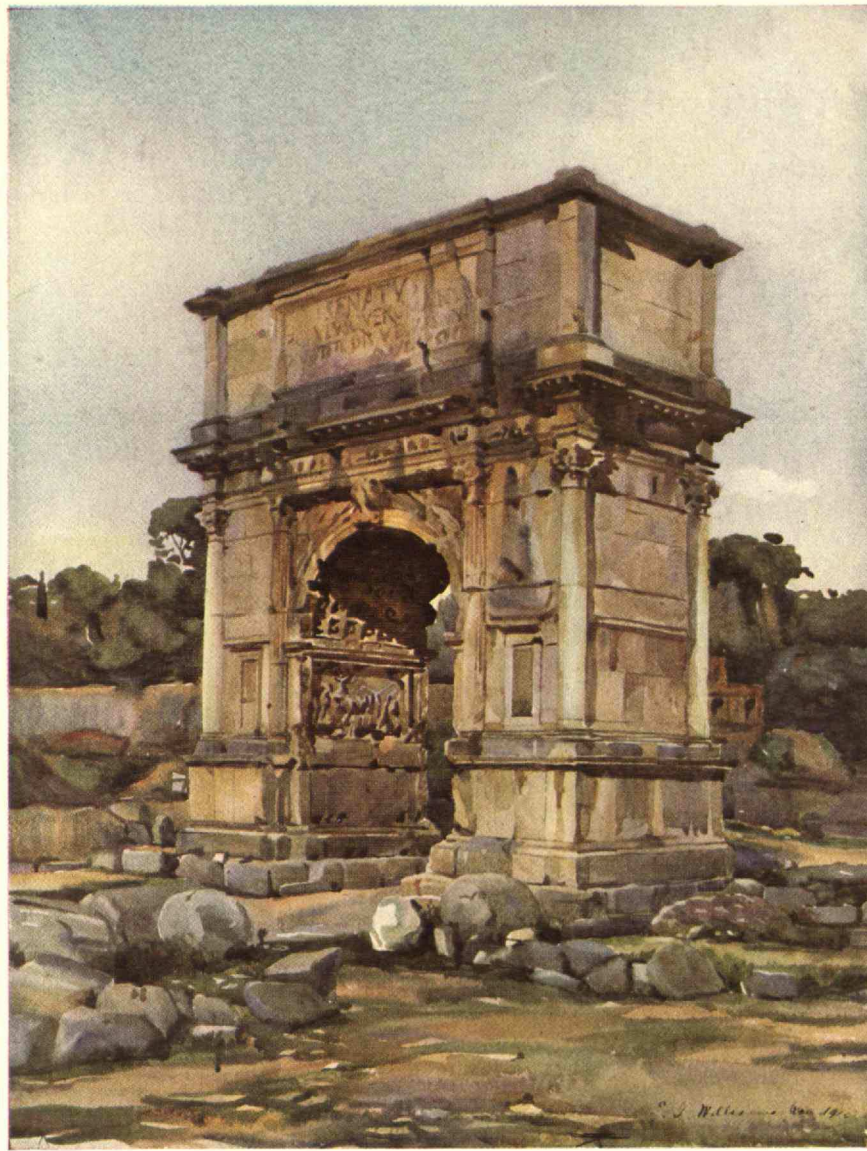


THE TECHNOLOGY REVIEW



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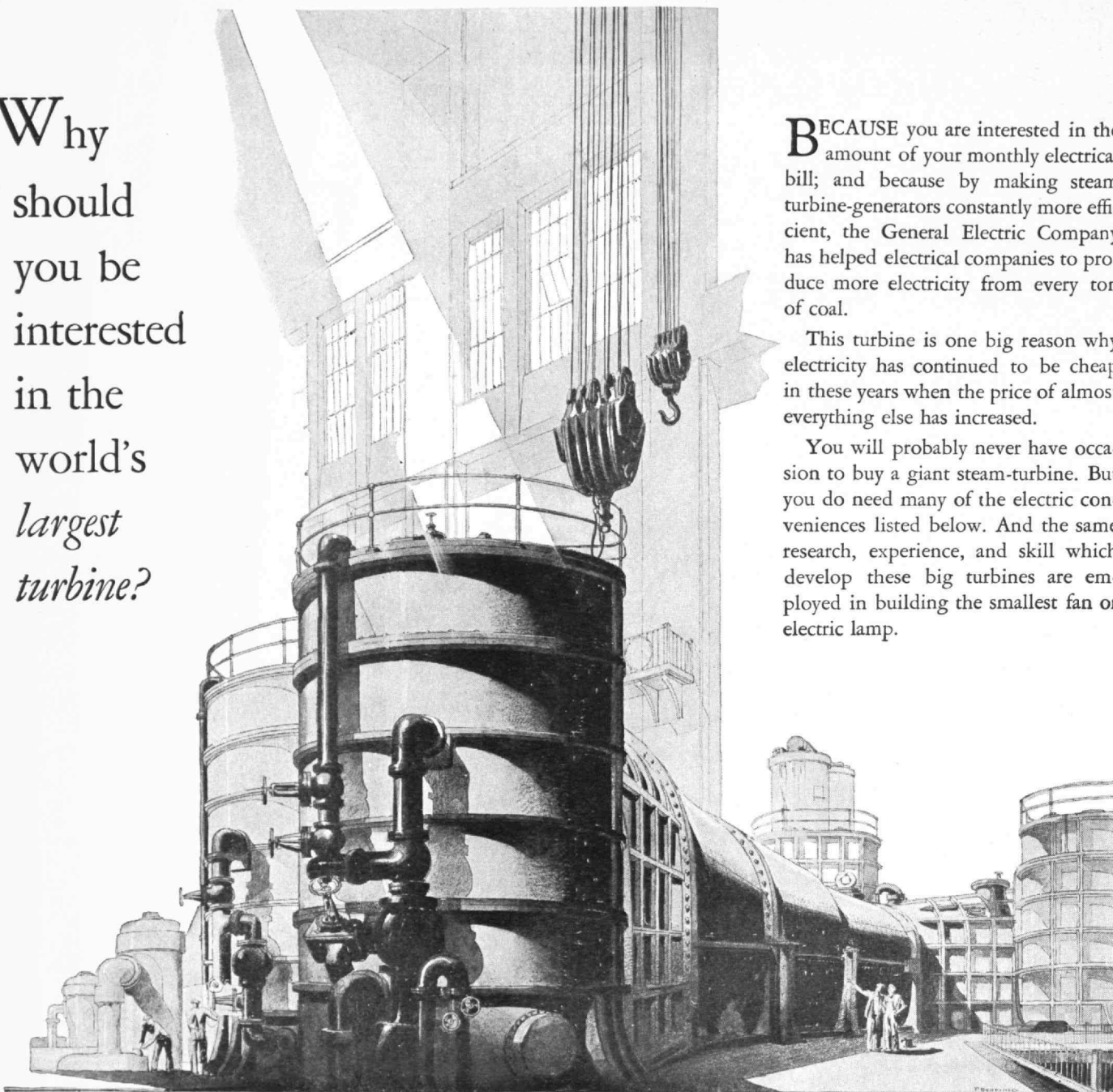
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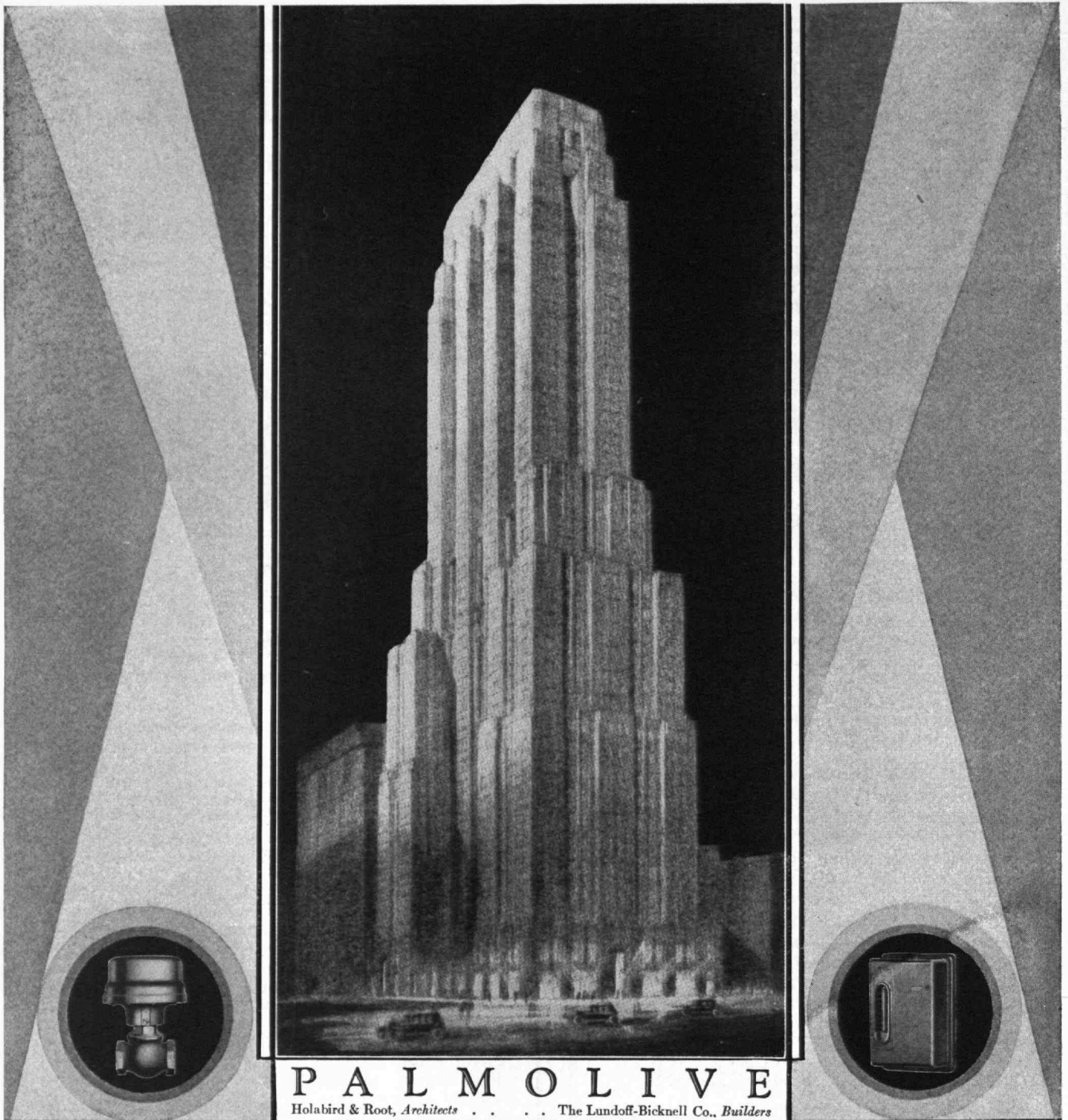
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THE TABULAR VIEW

DR. NORBERT WIENER'S theses in his article "Mathematics and Art" may aptly be applied to himself, for his great gifts as a mathematician are obviously paralleled by a singularly acute apprehension of the fundamental aspects of beauty in all art. As Henri Poincaré (1854-1912) once wrote, "Above all, adepts find in mathematics delights analogous to those that paintings and music give. They admire the delicate harmony of numbers and of forms: they are amazed when a new discovery discloses for them an unlooked for perspective, and the joy they thus experience, has it not the aesthetic character although the senses take no part in it? Only the privileged few are called to enjoy it fully, but is it not so with all the noblest arts?" Dr. Wiener is one of the privileged few. He will be remembered by Review readers for his commentary on the mathematics of S. S. Van Dine's "Bishop Murder Case" in the March, 1929, issue and for his article "Einsteiniana" in the May, 1929, issue.

THOMAS C. DESMOND, '09, (A.B. *magna cum laude*, Harvard '08) who contributes "South America in 1929," is President of the New York firm of T. C. Desmond and Company, Engineers. In addition to his professional work, he has actively participated in public affairs: in 1916 he was national Treasurer of the Roosevelt Non-Partisan League; for many years he has been President of the New York Young Men's Republican Club; and in 1928 he was a delegate to the Republican National Convention. He has also been a member of various housing commissions and is at the present time a director of the Murray Hill Trust Company. His wide experience, therefore, enabled him during his South American trip to view with an observant and searching eye the social, economic, and political aspects of the Latin countries.

JOHN R. FREEMAN, '76, has long been a leader in New England industrial life and he is internationally noted as an hydraulic engineer. His great ability is reflected in the four honorary Doctor of Science degrees which he has been awarded respectively by Brown, Tufts, *Sachs Technische Hochschule*, and the University of Pennsylvania. He assisted as a consultant in the construction of the Panama Canal, was in charge of the flood control developments on the Yellow River in China, and at present he is a member of the Engineering Council's Mississippi Flood Control Committee. He will be remembered for his article in The Review for December, 1927, entitled "Needed: More Science in Flood Control." The article in this issue is derived from the paper he presented at the World Engineering Congress meeting in Tokio during November, 1929.

ENGINEERING METHODS are most essential for the solution of complicated problems in industrial management. The Institute's Department of Economics, recognizing this, has initiated research work to evolve engineering and mathematical treatment of management problems in such a way that they can be applied by men in industry. The article on (*Continued on page 126*)

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THE TABULAR VIEW

(Concluded from page 125)

page 139 is a general exposition of one phase of this research: the determining of economic production quantities. Assistant Professor Fairfield E. Raymond, its author, has been engaged in this work for several years and has made significant contributions to the science of scheduling production. Professor Raymond received his Bachelor of Arts from Harvard in 1918 and his Bachelor of Science from the Institute in 1921. ☞ L. MAGRUDER PASSANO, Associate Professor of Mathematics at the Institute, is a frequent contributor to the department "Books." Those who have heard Professor Passano at the famous round table in the Institute's Faculty Dining Room will see reflected in his reviews his trenchant but withal merry observations on cabbages and kings. ☞ No recent book interpreting the meaning of modern science has conferred so much *éclat* upon its author as "The Nature of the Physical World" by ARTHUR S. EDDINGTON. Readers who found that book stimulating will be equally interested in an extension of it, "Science and the Unseen World." For a commentary on this Dr. WIENER was again commandeered as the man best qualified to do the job. (*Vide supra.*)

THE COLOR REPRODUCTION on the cover was reproduced from a water color, "The Arch of Titus," executed by EDGAR I. WILLIAMS, '08, in 1914. It is in the possession of the Institute's Department of Architecture. Mr. Williams is a practising architect in New York and is exceptionally gifted as a water colorist. Another study of his will be reproduced on the cover of a subsequent issue.

EDITORIAL FILES in The Review Office are well stocked with contributions for succeeding issues. There will be a series of articles on the history of science, a fertile field that has never really been plowed adequately. Among these are an article on the development of the physical sciences in America by Dr. JOSEPH MAYER and a fetching account of the career of Count Rumford by RICHARD W. HALE, '91. DONALD C. STOCKBARGER, '19, who contributed to the November, 1928, issue the now famous article "Check the Sun Bath," will be represented soon again by "Adventures in Radiation." From FREDERIC H. FAY, '93, has been obtained an abstract of an important and informative paper delivered by him before the American Society of Civil Engineers on the engineering development of Metropolitan Boston. ASA W. K. BILLINGS, JR., '26, will contribute an article on modern architecture, particularly that exemplified in Germany and Holland. There will also be articles on modern problems in ventilation, particularly on the possibility of scientifically ventilating and humidifying the small home. These will be followed by a paper on the contributions of science and engineering to domestic comfort.

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The TECHNOLOGY REVIEW

VOLUME 32

JANUARY, 1929

NUMBER 3

MATHEMATICS AND ART

Fundamental Identities in the Emotional Aspects of Each

BY NORBERT WIENER

THE relation between mathematics and the arts is attracting increased attention, both among the professional exponents of these two groups of pursuits and among the intellectual laity. Ever since the time of Plato, music and mathematics have been considered to stand in a peculiarly intimate relation to each other and this opinion is confirmed by the intense enthusiasm for music displayed by so many mathematicians. Everybody knows that Einstein is a first-class violinist, indeed of concert rank. Max Born has two grand pianos in his study and takes recreation from his physical researches by playing duets with his wife. In this country Professor Morse of Harvard, Professor Silverman of Dartmouth, and Professor Jackson of Minnesota are among the many distinguished mathematicians who show an unusual degree of interest and proficiency in music. This interest in music is shown to a much greater extent than one would expect merely from the fact that they are cultured.

Again, the mathematical aspects of design are unmistakable. A most interesting study of repeating patterns is to be found in *Theorie der endlichen Gruppen* of Professor Speiser of the University of Zürich. Certain writers, such as Professor Birkhoff of Harvard, carry the mathematical treatment of design much further, and attempt to lay down a general mathematical criterion of plastic beauty.

With these tendencies the present essay is not directly concerned. Our thesis is not

that the arts are an expression of mathematics through the senses, but that mathematics itself is in the strictest sense of the word, a fine art. In this the author finds himself in complete accord with the views expressed by Havelock Ellis in "The Dance of Life." The author is fully conscious of the quicksands on which every commentator on general æsthetic theory must tread. However, he considers that he shall establish his point if he succeeds in maintaining the following theses: that

mathematical work may produce an emotion indistinguishable from that of æsthetic contemplation; that mathematical investigation

may and often does have as its goal the production of a work capable of

exciting this emotion; that the creative mathematician is limited by the requirements of rigor only

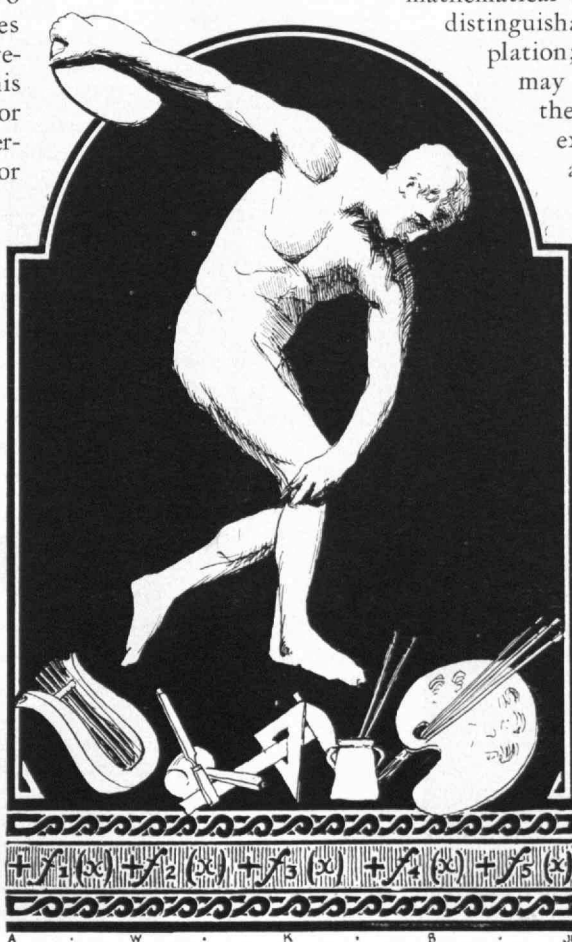
as any creative artist is limited by the nature of his medium; and finally, that

mathematics has participated intrinsically in all the larger movements common to the

several arts. Mathematics produces an æsthetic emotion. I cannot, indeed, show this

by a process of logical argument. The attempts of Spinoza to treat the emotions *more*

geometrico have not been a conspicuous success. My only appeal must be to introspection and to the comparison of the introspections of myself and of many mathematical colleagues with those of persons competent to pronounce an opinion on the other fine arts. My own introspections are in substantial agreement with those of such mathematicians as have



discussed this point with me and are clear and unambiguous. Neither in quality nor in intensity can I distinguish between the thrill of delight with which I contemplate a mighty painting, a noble building, or the embodiment of dire necessity in a great tragedy, and that other thrill when the several threads of thought in a mathematical theory are seen to gather themselves together into one perfect fabric. It is an inner unity and purpose masked by a superficial diversity that calls forth our deepest awe and intensest admiration. The tragic irony of the Greek dramatists who portray compelling necessity masked by the futile desires and purposes of the individual has, as Professor Whitehead has pointed out, an emotional appeal which is identical with that of mathematics in kind. As to the intensity of the emotional appeal of mathematicians, no one save the mathematician himself is competent to pronounce an opinion, and I doubt if he will put this intensity far below that of the other arts.

It will be noted that we have compared mathematics rather with the arts of grandeur than with the arts of lyric beauty. This is not accidental. If we arrange the arts in the scale of the "warmth" or "coldness" of the emotions they express, we shall find that they already show very decided differences among themselves. Thus architecture is a colder, more impersonal art than sculpture, sculpture than painting, the epic than the lyric. Mathematics is scarcely a colder art than that of the arabesques, which are such a glory to Moslem architecture. Like the arabesques, mathematics has its moods, if not of lyric outburst, yet of fragile daintiness. To these moods I should refer much of algebraic geometry, most of the classical number-theory, and a great deal of the theory of finite groups.

As to the fundamental identity between the emotional aspect of mathematics and that of the fine arts, I have the further confirmation of my thesis in a comparison of my own experiences in mathematical research with those of persons engaged in creative literary work. There is the same peculiar feeling that one's work possesses a vitality of its own, manifesting itself through one but independently of one, the same large share of the subconscious, the same elation as the work approaches its final form, and the same nausea

of satiety on its completion. Perhaps, as Ellis suggests, these are the ordinary emotional experiences of sexual sublimation, but, in this case, mathematics is as valid a form of sublimation as any of the arts. While these introspections bear more witness to the private emotions of the artist than to those of his audience or public, it is surely only reasonable to suppose that the artist, whom the work is designed to express in some way or other, participates to the highest degree in the purely æsthetic appreciation of his own work.

My hypothetical adversary might retort that this similarity between the psychology of creation in art and in mathematics is beside the point, in that in the case of the true arts, the artist is consciously working to reproduce in his public the particular emotion which fills his being, while the creative emotions of the mathematician are not germane to the effect which he is designing to create. I believe that this thesis is due to a complete misunderstanding of the purpose of both the mathematician and the artist. The purpose of the musician or plastic artist varies according to whether the artist is, on the one hand, freely creative or, on the other, is producing a piece of work to fit in to a pre-assigned operatic scheme or decorative ensemble. At his best we speak of the artist as a "fine" artist and thus distinguish him from the less free, more subservient artisan. It is very difficult to show just what the purpose of the "fine" artist is. He probably is more governed by an internal, compelling force than by any philosophical reflection as to the emotion which a particular work of art may excite. Insofar as this compelling force may be rationalized into words it says to him, "This is beautiful. Let me display it to the world." In any case it is not a matter of the artist laboring to express the emotion to

the public but rather of the emotion endeavoring to express the artist.

The relation between the mathematician, his public, and his emotion is quite the same. You may rationalize his thoughts into some such statement as "This is an interesting idea. Let me show my colleagues—my public—where it leads." This is quite similar to the rationalized statement of the artist's impulse, and like it, is quite false. The mathematician does research because



SEBASTIAN BACH (ABOVE)
AND LEONARD EULER
(BELOW) FURNISH A
STRIKING PARALLEL IN
THEIR LIFE AND WORK



JONATHAN SWIFT
(LEFT) IN LITER-
ATURE AND SIR
ISAAC NEWTON
(RIGHT) IN MATH-
EMATICS EX-
PRESSED OBJECTIVE
MINDEDNESS



the research demands to be done. All through his moments and highest creative effort there is the same exaltation of contact with beauty that inspires his colleagues in the fine arts in the narrower sense. Let it be

understood that we are here talking of the pure mathematician. The applied mathematician is an artisan of mathematics bound by his problem rather than by the free flow of his ideas and receiving this problem from sources beyond his control.

Of course even within pure mathematics or the fine arts the subject matter of interest may be restricted. The mathematician *may* decide to confine his attention to the tritangent planes of twisted curves of degree higher than the seventh, and may resolutely shut the door in the face of the temptations of other problems, but then, the artist may decide in just as arbitrary a way to do nothing but flower pieces, or marines, or portraits of royalty and millionaires, or some other equally limited type of work. Naturally, no artist unquestionably of the first rank would accept any so arbitrary a restriction of his interests; but then, no Hilbert or Poincaré would fail to follow an interesting problem wheresoever it might lead him. To the great mathematician as to the great artist, the world is rich in beauties of order that call on him to proclaim them at large, until he becomes the mere mouthpiece of structure and system proclaiming themselves.

Another point on which my devil's advocate might criticize my claims for mathematics is that of the rigid, inflexible character of the mathematician's logic. "Art," he might well say, "is free self-expression, unbound by rigid and compelling rule. On the other hand, the mathematician may turn neither to the right nor to the left, but must inexorably follow a pre-assigned path." It will be apparent to all that *advocatus diaboli* is now a romanticist, for he has forgotten the Unities of the Drama, the classical canons of sculpture and of architecture, and all the rest of that rigid apparatus of criticism so clearly set forth by a Ben Jonson or a Lessing.



EVARISTE GALOIS
(LEFT) AND LORD
BYRON, MATHE-
MATICIAN AND
POET, WERE BOTH
ROMANTICISTS



Nevertheless, without committing ourselves to the classical side of the romantic controversy, we may make out a pretty good case for mathematics. Every art has a medium, and with the potentialities and limitations of

his medium every competent artist must be familiar. If a mere fiat should summon at the command of a painter just the effect he may desire, why — painting would not be worth one moment's serious consideration. The sculptor is more likely to scorn the aid of pneumatic cutting tools than to welcome it. The medium of mathematics is logical thinking, and it is just because it is a stubborn medium that the triumphs of the mathematician are worth while. There is an element of conquest, of difficulties overcome, in all art, if not in all natural beauty. It is only through this that man may compensate for the unachievable grandeur and perfection of the beauties of nature. If art were not otherwise difficult, it would be necessary for it to invent obstacles for the sake of overcoming them. It is just because it is no easy subject that

mathematics is an art, and the difficulty of mathematics consists in the difficulty of achieving its aim within the strict bounds of rigor.

Finally, mathematics has been an active participant in the larger æsthetic movements. The gospel of the Greeks of perfection within rigid limitations and conventions, that has given repose to their statues and unity to their drama, is paralleled by the perfection of their geometry as a closed system, not countenancing irrational numbers nor constructions not to be carried out through the ruler and compass or the conic sections. Within these limitations, Greek geometry comes nearer to withstanding the critical tests of modern rigor than anything between

it and the Nineteenth Century. I am too ignorant of Oriental mathematics to draw a close parallel between it and the arts of India and Islam, but surely the European mathematics of the Middle Ages betrays the same conventionalism and traditionalism that stamps all the intellectual and artistic efforts of the period.

The first great age of modern mathematics, the period



THE AUTHOR (LEFT) WITH MAX BORN WHEN THE LATTER
WAS LECTURING AT THE INSTITUTE IN 1925

from Descartes to Newton and from Newton to the middle of the Eighteenth Century, coincides with what is known as the Enlightenment. Roughly speaking, it is the era when French taste dominates Europe. It is the age when clearness and distinctness are the catchwords of the philosophers, and common sense is the canon of the literary men. It is the age when comfortable and graceful living is valued more than high ideals and noble aspirations. It is the age when Swift embodies his religion in "The Tale of a Tub," when Dr. Johnson refutes Berkeley's subjectivism by kicking a stone. Subjectivism is indeed out of fashion in this hard-headed epoch, and such philosophers as Berkeley or Malebranche lie outside of the main channels of ideas.

Among Berkeley's works, although not generally read by his philosophical students, are his "Letters to an Infidel Mathematician." The Infidel Mathematician was Halley, Newton's friend and disciple, and the letters constitute a most acute critique of Newton's hypothesis of infinitesimals. At the distance of 200 years, the controversy makes interesting reading. Berkeley has everywhere the better of the argument, and a modern mathematical logician would substantiate almost every word he says. But Newton's Calculus still stands. Why? Because Newton, like the men of his age, was objectively minded. The solid unspirituality that characterizes the writings of Molière and Pope, of Swift and Defoe, of Addison and Fielding, different as all these writers are; the worldliness that marks the architecture of Versailles or the paintings of the later Dutch schools — all these are reflected in the healthy interest which Newton has in mathematical facts rather than mathematical proofs. Newton's mathematical logic is as dead as the dinosaurs, save where it has been preserved as a fossil in college textbooks of the baser sort, but Newton's system marches on.

This Eighteenth Century classicism, more akin to the classicism of Rome than to that of Greece, this hard-headed, objective-mindedness, comes to the fore in the work of other great mathematicians of the period. It is doubtful whether Euler, perhaps the greatest mathematical genius who ever lived, had a clean-cut notion of what constitutes a mathematical proof. His idea of a function, of a series, of convergence, is hazy in the extreme, and does not begin to stand up under the criticism of modern rigor. Nevertheless his superb insight has made his collected works a mine of material for the latter day mathematician which is yet unexhausted.

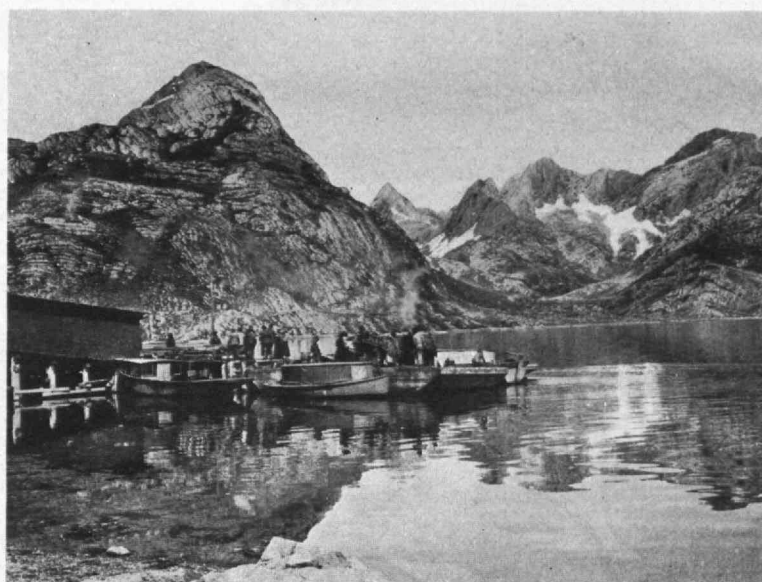
It is perhaps interesting to compare the career of Euler with that of his earlier contemporary, Bach. Euler, like Bach, has left behind him a simply enormous body of work. Like Bach and like all the great men of his age, he worked largely under court patronage, yet lived an essentially secluded life. He lived to the age of seventy-six (Bach died at seventy-five) and, again like Bach, he finished his years in a blindness which scarcely affected his activity. Both married twice, both had enormous families, which, though able, did not rival their sires.

With the waning of the Eighteenth Century a new element, romanticism, makes its appearance in the literature. The first foretaste of romanticism is the exaltation of the "sensitive man." It is no longer enough to take the world as a matter of course, as an object to which one's own personality is not relative. The sensitive is one

like Sterne who has an emotional reaction, appropriate even though excessive, to the smallest event in his daily life. This induction of the self, of the author into literature, joins up with other movements such as the love for Italy and the Orient that the growing ease of travel begins to induce in the upper classes and the misty grandeur of the poems of Ossian to form the beginning of the romantic movement.

To Havelock Ellis, romanticism is foreign to mathematics. While it is obvious that the colder emotional tone of mathematics prevents it from entering to the full into this movement, to the mathematician himself the possibility of romantic mathematics is not so absurd. What do the mathematicians do at about this time? We may pass over the works of LaPlace, Legendre, and LaGrange as belonging largely in spirit to the preceding epoch and may consider such writers as Cauchy, Galois, and Abel as initiators of the new movement. First of all the work of these men and of their contemporaries is characterized by the fact that almost every one of them appears as the inventor of a mathematical discipline of his own. Of course this is not the first time in mathematical literature that a man's name is associated with a mathematical theory. Analytical geometry belongs to Descartes and the differential calculus in Newton and Leibnitz, but the greater part of the Eighteenth Century is occupied by men who regard their work more as a step in the general development of mathematics than as a discipline of their own. The assertion of the self in this conception of a private scientific discipline is even more strongly shown in the new interest given to mathematical rigor. It may seem far fetched to refer to the new impulse toward mathematical rigor as a manifestation of the romantic movement, but romantic it is in its subjectivism. It is not the theorem which now forms the chief center of attraction: it is the proof of the theorem. Euler would have asked, "What are the facts in this branch of mathematics?" Cauchy asks, "How may I arrive at them?" This connection between rigor of mathematical analysis and romanticism is even more clearly displayed in the work of Bolyai. Like Galois, Bolyai lived the life of a true romanticist. Galois was killed in a duel arising from a love affair and the greater part of his mathematical writings was set down by him on the eve of his death. Bolyai was a cavalry officer who on one occasion fought seven successive duels with fellow officers on the condition of being allowed to play his violin between each two consecutive combats. These are manifestations of Byronism pure and undiluted. Bolyai's mathematical work is in essence as romantic as his personal character. As one of the founders of the non-Euclidean geometry, he voluntarily and consciously chose to follow a path which at least at that time seemed to be outside of the direct stream of classical mathematics. Not only did he help to invent a discipline of his own, but he did so in direct revolt against the classical tradition in mathematics. This seemed to indicate that some method yet might be found for establishing Euclid's parallel postulate. Of course by his critical efforts Bolyai furthered the cause of rigor, but rigor came as a consequence of revolt.

Among other founders of discipline and romanticism in mathematics we must refer to Grassmann with his calculus of expansion and to (*Continued on page 160*)



Courtesy of W. Spencer Hutchinson

LAKE PUNRUN, CENTRAL PERU, ELEVATION 14,200 FEET, 1,655 FEET HIGHER THAN LAKE TITICACA

SOUTH AMERICA IN 1929

An Engineer's Impressions of the Latin Countries

BY THOMAS C. DESMOND

ONE day on deck at sea coming north to New York from our last mainland port in South America, Rio de Janeiro, I said to my wife, having in mind the words of an old song: "Well, how do you like rolling *up* from Rio?"

"I wish, instead," she replied, "that we were rolling *down* to Rio, and starting out to do our whole South American trip over again."

As I thought again, in pleasant reminiscence, of South America and the charm any visitor can find there, I wished so, too. Perhaps it was because of the personal courtesies shown to us in so many places, for nowhere are people more polite and kind to strangers than in South America. Perhaps it was because of the romantic associations of crossing the Equator and then sailing on south and yet more south, until at Valparaiso and Buenos Aires we were almost as far south as New York City is north of the Equator. So far south we were, in fact, that the seasons were reversed and spring in New York became autumn in Valparaiso. Whatever were the contributing reasons, our trip, last spring and early summer, was one that left with us rich memories.



Our route took us from New York City to Havana, Cuba, then through the Panama Canal and down the west coast of South America to Peru. After visiting for several weeks in Peru and Bolivia, we went by ship, again south, to Valparaiso, Chile. From Chile we crossed the Andes Mountains to Argentina and then sailed north along the east coast of South America to Uruguay, and Brazil. Our only stop, coming north again to New York City by ship from Rio de Janeiro, was at Trinidad, British West Indies. The three months of eventful, crowded days and nights in the strange countries of our trip seemed, as is usually the case when traveling, much longer than three ordinary months at home. We spent but little time in Havana and at the Panama Canal, because we had visited both on a previous cruise through the West Indies.

No matter how many times before, however, one may have visited the Panama Canal, it is always thrilling to go through the several great locks and Gatun Lake by daylight as we did on this voyage.

Of course, when sailing southward from Panama to Peru, one soon crosses the Equator. Near the time of our crossing, all passengers and members of the crew were



LEFT: THE HIGH CORDILLERA, WITH ELEVATIONS OF 17,000 FEET AND MORE. BELOW: FOREMAN IN NITRATE MINE IN NORTHERN CHILE HOLDING A PIECE OF BURNING WICK AND A SMALL PICK USED TO DETERMINE THE AMOUNT OF NITRATE IN THE ROCK

Photographs
furnished by
W. Spencer
Hutchinson



duly summoned to appear before Father Neptune and his gaily costumed court. In accordance with long established seafaring custom, all those aboard who did not possess certificates proving that they had "crossed the line" before, had to submit to the prescribed ceremonies of initiation. The ceremonies started with the serving to initiates, some of whom were sitting on chairs strangely supplied with electrical contacts, of cocktails containing vinegar and hair oil; then continued with other rites, including a series of alleged shaves that made use of ship's deck mops and some sort of whitewash paste for shaving helps; and ended with a final toss of the ladies and gentlemen initiated, clothes and all, into the swimming tank.

At about the time of crossing the Equator, the famous Humboldt ocean current is also first encountered. The Humboldt current flows northward from the Antarctic and affects in important ways nearly the whole of the western coast of South America. For instance, it is considered to be responsible for the almost total lack of rainfall that has made a desert of the coast areas of Peru and northern Chile. But the cold Humboldt current brings with it from the Antarctic much small fish life. As a result, sea lions and fish-eating birds are also abundant in and near it, and no part of the ocean is more interesting to a naturalist. Sometimes hundreds of thousands of guano birds can be seen there at one time, flying close over the water or diving for fish. The guano fertilizer which these birds produce on the so-called guano islands near Peru is sold to farmers in the United States and elsewhere, and the receipts from its disposal form an important item in the Peruvian revenue.

What especially would you advise other travelers to see in South America? Such questions as this, asked by friends since our return, bring back vivid memories: memories, for instance, of one of the cities we visited first, Lima, Peru. Lima, now the capital of Peru only, was once the seat of the Spanish viceroyalty for the whole of South America. The University in Lima, opened shortly after the Spanish conquest, was a century old before Harvard, the oldest university in North

America, was even founded. When one visits this venerable seat of learning, with its beautiful mediaeval cloisters, and remembers with regret the ignorance and prejudices of some of our own countrymen regarding South America

(as keenly noted and deplored by South Americans themselves), one understands why South Americans justly appreciated so much the thoughtful greeting of former Secretary of State Elihu Root upon the occasion of his visit to South America: "We, from the newer civilization of the North, salute the older civilization of South America."

Every traveler to South America, if possible, should visit Cuzco, Peru, the ancient capital of the Incas, a city that had existed for centuries before Columbus sailed on



From the Author's Collection

BAY OF VALPARAISO, CHILE

RIGHT: A STREET SCENE IN CHINCHE
IN THE COASTAL DISTRICT OF PERU
Courtesy of W. Spencer Hutchinson

BELOW: DANGEROUS PLAY AT THE
SNAKE FARM, SAO PAULO, BRAZIL



*From the
Author's
Collection*

his first voyage. The many remaining Inca walls of Cuzco, with their carefully jointed stonework, evidence a high degree of native civilization, and, for the traveler who has read Prescott, the great square of Cuzco still

stands to thrill one with its many tragic memories.

Lake Titicaca, on the way from Cuzco to La Paz, Bolivia, is, with a single exception, the highest navigable lake in the world, 12,500 feet above sea level. The exception, Lake Punrun in Central Peru, surpasses Titicaca by 1,655 feet. The Indian natives still sail, on Lake Titicaca, boats made of the lake "balsa" reeds, just as they did 400 years ago at the time of the Spanish conquest. The Andes Mountains, which of course are far higher



than the Alps or the Rockies, are especially impressive near Lake Titicaca. I have seen in India what I consider the most glorious mountain view in the world, the view from Darjeeling across to the Himalayas. Second to that view only, in my opinion, is the view across Lake Titicaca to the Sorata Andes range; seventy-five miles of snow clad summits 21,000 feet and more above the sea.

La Paz, Bolivia, is one of the few places in the world where the natives still dress today like old-time natives, as they should always do everywhere for the sake of tourists! My wife and I were in Constantinople, Turkey, several years ago, just after the new Turkish government had put a stop to the wearing of veils by women and fezzes by men. From a local-color standpoint, the results in Constantinople were disappointing. But there is still no absence of native color in La Paz. In this unique mountain capital, so high above sea level that travelers with weak hearts must not visit it, the streets and markets are still filled daily with thousands of native Aymaras in gaily colored costumes. The men wear ponchos of varied colors, mostly reds and yellows. Some of the curious hats of the women resemble our own derbies and the ambitions of all the native women seem to be to wear as many colored petticoats as possible. They do not appear very clean, but they do look picturesque.

South America is a continent of striking contrasts. When observing some of the hundreds of thousands of native or half-breed Quichua and Aymara Indians who live in Peru and Bolivia under primitive, only partly civilized conditions, it is hard to realize that South America also has beautiful, modern cities like Buenos Aires and Rio de Janeiro, cities which compare favorably with any of the other great capitals of the world. It is hard to realize also that, only a few miles beyond the high, cold and almost desert Peruvian mountain ranges, lie low, hot, luxuriant Brazilian tropical valleys. Primitive and civilized, hot and cold, high and low: many more such contrasting adjectives would have to be used by anyone attempting to describe the people, scenes and things found in South America. (Continued on page 162)



From the Author's Collection

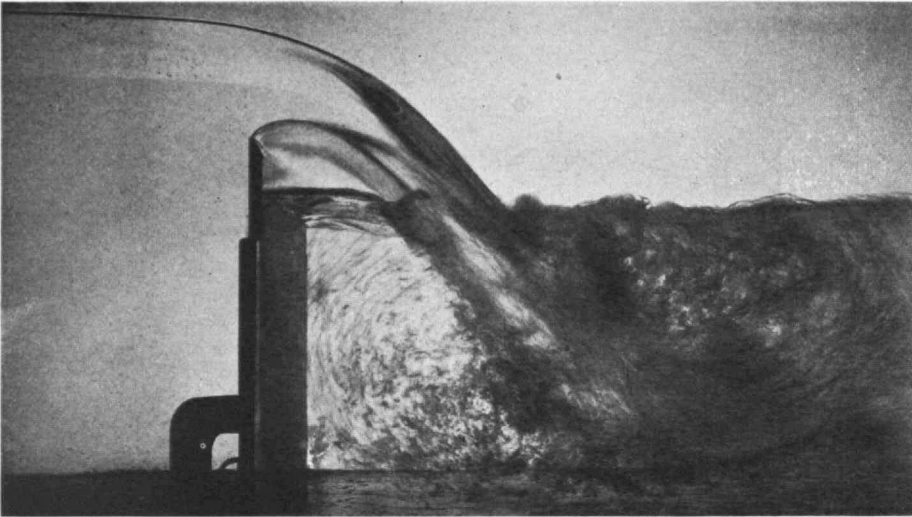
BEACH AT MONTEVIDEO, URUGUAY

MASTERING RIVERS

Progress in Hydraulic

By JOHN

Illustrated from Photographs



THE RIVER-HYDRAULIC LABORATORY OF THE TECHNICAL UNIVERSITY AT KARLSRUHE, GERMANY.
FLOW THROUGH SHARP-CRESTED SUPPRESSED WEIR

WITHIN the past few years there has been a remarkable advance in the methods of hydraulic experiment based on the Principle of Similitude set forth by the great English natural philosopher, Sir Isaac Newton, in a single paragraph of his monumental treatise, the "Principia," 243 years ago. The practical application of this idea to the flow of water in channels of various forms lay dormant until about 45 years ago, when it was applied to two important practical problems by two eminent English civil engineers. The first of these, Professor Osborne Reynolds of the University of Manchester, about 1885, invoked the Principle of Similitude and the use of scale models in the investigations of water flow of the tidal estuary of the River Mersey at Liverpool. About a year later, Sir William Vernon-Harcourt applied these principles in experimenting upon the improvements for navigation near the mouth of the River Seine in France. It is of interest to note that another great English hydraulician, Professor Gibson of Manchester, England, has recently constructed a new hydraulic laboratory named the "Osborne Reynolds Laboratory," at the University of Manchester, in which by means of a small-scale model he is now making researches relative to the effect of building a great dam across the estuary of the River Severn for the development of power from the flow of the tide.

It is remarkable how long a fruitful idea sometimes lies dormant and then suddenly bursts into great and widespread activity. This was true of the invention of the Mannheim slide rule, which for nearly a century lay dormant and then, suddenly

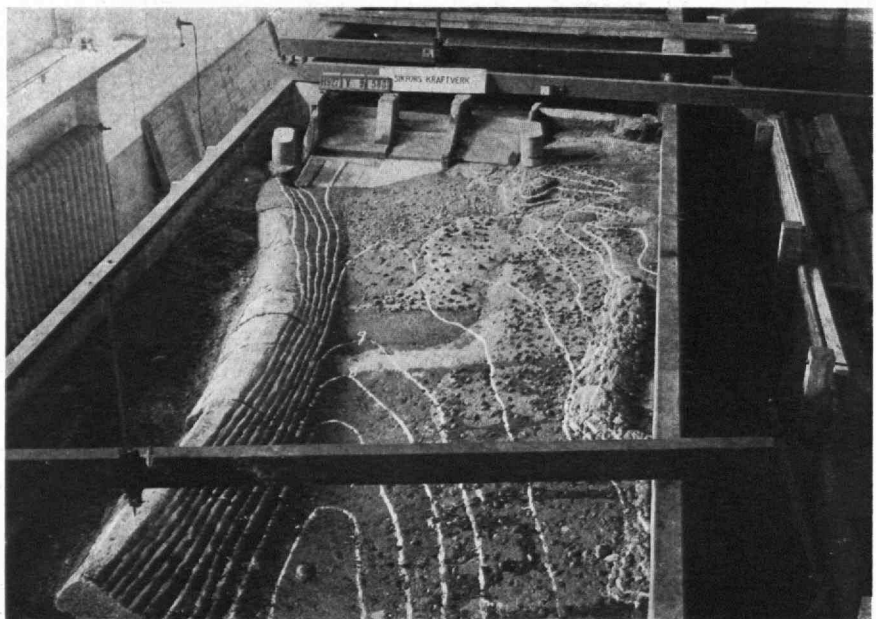
within a decade, this instrument was found on the work table or in the pocket of every progressive engineer.

It was more than 175 years after Newton had stated this Principle of Similitude that the English naval engineer, Froude, applied it to researches for determining the best shape of a ship, by constructing a long narrow tank filled with water and drawing through this various small-scale models of ship-hulls

at varying velocities, meanwhile measuring the resistance to traction at the various speeds with skilfully devised apparatus.

Although Froude, by the application of the Doctrine of Similitude to scale models, revolutionized the design of hulls in naval architecture, the complementary process of causing a current of water to flow past a fixed model of a structure proposed to be built within a flowing river or canal, was not actively taken up until another quarter century had passed.

Although Fargue in France, in 1875, was first to experiment with a scale model of a river with a view to learning what would happen in the actual river 100 times as large as the model, and Osborne Reynolds and Vernon



IN THE HYDRAULIC STRUCTURES LABORATORY OF THE ROYAL TECHNICAL UNIVERSITY AT STOCKHOLM, SWEDEN

IN THE LABORATORY

Laboratory Research

R. FREEMAN

Collected by Kenneth C. Reynolds

Harcourt in England had made researches with scale models of river channels, this renaissance appears to have been due chiefly to Dr. Hubert Engels, Professor of Hydraulics at the Technical University of Dresden, Germany, who in 1891 began his hydraulic experiments with models.

His first permanent hydraulic laboratory was built-in in the old building of the Dresden Technical University in 1898. Dr. Engels gradually increased the range of his experiments and rebuilt his laboratory in larger form. The utility of the methods which he introduced quickly attracted the attention of the other German engineering colleges, where new and larger laboratories were built; guided often by the friendly personal counsel of Dr. Engels. The idea spread soon afterward to Austria, to Sweden, to Norway and to Italy, and the mathematical doctrine stated in outline by Newton somewhat obscurely in a single paragraph has been expanded and elaborated to cover a wide range of problems, all the way from water power turbine design to the improvement of harbors. Researches carried on by means of this principle relate to the improvement of both the efficiency and capacity of hydraulic turbines, to finding

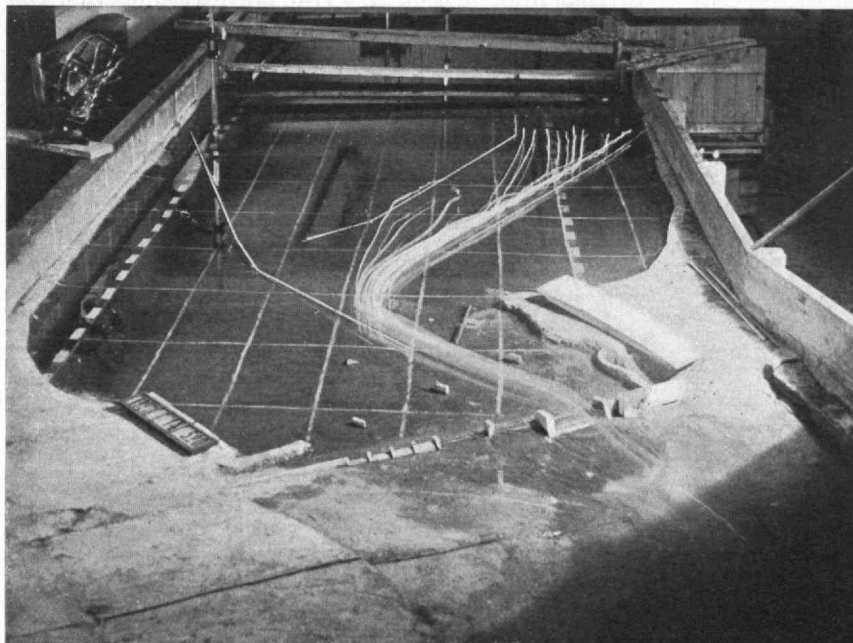


STUDY OF ELBE RIVER (SCALE: 1:200) AT EXPERIMENT INSTITUTE FOR HYDRAULIC ENGINEERING AND SHIPBUILDING IN BERLIN

remedies for the evils of cavitation in turbines, to improvements in efficiency and capacity of centrifugal pumps and propeller pumps; also to improving the designs of spillways for water power dams; to the designing of great sluiceways so as to present a minimum loss of head, and to finding the best means of dissipating energy of flood waters flowing over a high dam and tending to cause disastrous scour in the river bed below the dam.

THE utility of the hydraulic laboratory also has been extended to studies of the movement of gravel bars in river channels, to finding the best forms of groins for regulating the course of rivers, and holding them to their proper channels, to the improvement of harbors and navigable rivers by controlling the deposit of sediment brought in by the tide from littoral currents or brought down by the river, and to methods of preventing seacoast erosion, — yet its great service to hydraulic science and to the hydraulic arts has hardly more than begun.

In brief, a new and most valuable lot of tools has been placed in the hands of the hydraulic engineer for solving a great variety of important problems. The working out of the mathematical laws of hydraulic similitude and the expressing of these laws in convenient formulas, makes it possible for the engineer to set up his laboratory apparatus, with great confidence that the behavior of water currents in river, harbor or structures for water power development will be for all practical purposes nearly enough the same as the behavior found in the laboratory model; which may have anywhere



HYDRAULIC STRUCTURES LABORATORY OF ROYAL TECHNICAL UNIVERSITY, STOCKHOLM, SHOWING 1:200 SCALE MODEL OF INDAL RIVER ABOVE HAMMARFORSEN POWER PLANT

from one-tenth to one-hundredth part of the linear dimensions of the proposed structure.

Valuable suggestions as to the course of water through a large hydraulic structure can be had by merely watching its course, its eddies, its pulsations, and its deposits of sediment, in a small model, made either true to scale in all linear dimensions, or distorted in relations of width to depth; but if one would get the full benefit of hydraulic experiments made with models one must constantly be guided by the mathematical theories of dynamic and kinematic similarity, and this is the rule of procedure in these modern hydraulic laboratories.

The laws for governing the relation of dimensions and velocities in models are mostly of a simple form. For one example: The velocity in the model compared with that in nature should be in the proportion of the square root of the model scale, or with a model built to the scale of 1 to 100 the velocity should be 1/10th of that in nature; but this is not the place to discuss these relations at length. They have been worked out for a great variety of conditions and their development is still in progress.

In some cases one must depart from model proportions dictated by theory, particularly when dealing with the movement of sediments, because here the relations may be complicated by effects of surface tension on minute particles, or by skin friction, or by non-turbulent motion of water at low velocities. In many cases of river and harbor research one must have recourse to experiments for finding a sedimentary material of such size of particle and such specific gravity that its general behavior in formation of deposits and erosion cavities in the model will be analogous to that observed in nature in the far larger channel. Also sometimes a distortion of the scale of the depth or width of the model channel becomes useful and results become qualitative rather than quantitative.

In other words, for rivers and harbors, researches upon sedimentation and erosion by means of models must be carried on hand in hand with observations upon the natural river, harbor or other channel which it is desired to improve, and with the aid of varied experiments and matured judgment.

The glass-walled flume and the motion picture camera have been made most valuable instruments for study, particularly with regard to erosion of gravel in river beds and the travel of sand waves and gravel



MODEL AT MARQUARDT (BERLIN) OF HENGSTEY SETTLING BASIN ON RUHR RIVER

bars in river beds. By taking pictures at high speed and slowing them down in the projector, movements too rapid for the eye to follow can be studied at leisure. The laboratory at Karlsruhe, Germany, has been particularly active in this branch of research.

No reasonable doubt of the value of these methods in skilled hands can be retained after a study of the work accomplished in the laboratory of the German Navy Depart-

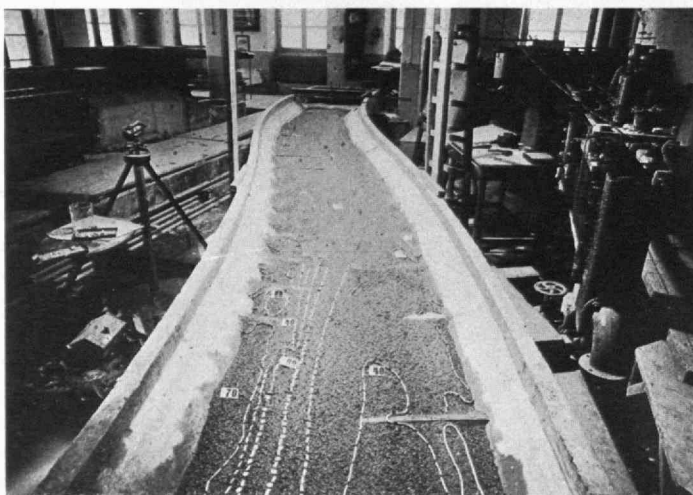
ment at Wilhelmshaven with regard to remedies for objectionable sand deposits in the adjacent harbor, or after a study of many researches carried on at Karlsruhe, Charlottenburg, and other parts of Germany, Sweden and Austria and elsewhere, in relation to river erosion.

The value of the laboratory method of research has been so abundantly proved during the past 10 years at the older laboratories at Dresden, Charlottenburg, Karlsruhe, Darmstadt, Wilhelmshaven, and so on, that large new laboratories have recently been constructed at Delft, Holland; at Zurich, Switzerland; at the Walchensee near Munich, Bavaria; and elsewhere; devised in some cases to serve the double purpose of instruction to students and of fundamental research. A new laboratory that has greatly interested the author is that just completed at Tashkent, Russian Turkestan, by the Soviet government for the special study of the hydraulics of irrigation, which, from photographs and drawings appears beautiful in architecture and admirably planned.

Examples can be cited to show that where putting the question of how to improve the navigable quality or flood discharge of a river by experiment at full-scale in the actual river might cost \$100,000 to \$1,000,000 and require from one year to ten years for an answer, one can put the question to experiment by means of a series of laboratory models at a cost not exceeding the one-hundredth part of that of the full-scale experiment in the river, and thus in the laboratory receive a dependable answer in the course of from one to three months, which it would require many years to arrive at by the far more costly experiment on the actual river.

Examples can also be cited from experiences at various hydraulic laboratories, in which a saving in construction costs amounting to from ten to 100 times the cost of the model has been accomplished by experiments in qualified hands in a hydraulic laboratory.

The Director of the great hydraulic laboratory at Karlsruhe stated to the author that each of several major
(Continued on page 168)



1:200 SCALE MODEL OF RHINE BETWEEN SONDESSHEIM AND MANNHEIM (TECHNICAL UNIVERSITY AT KARLSRUHE)

ECONOMIC PRODUCTION LOTS

Mathematics Comes to the Rescue of Industrial Management

BY FAIRFIELD E. RAYMOND

HOW many industrial executives have ever really stopped to consider to what extent the actual earning power of a corporation depends upon those factors which enter into the scheduling of production? One is not supposed to imply from this remark that any less importance should be attached to other phases of manufacture, because scientific methods of management will continue to be the basis of all industrial progress wherever they may be applied. For the most part, production control has been considered to be primarily concerned with the coördination of those elements incidental to any given process which will lead to the lowest manufacturing cost, whereas those in charge of production have had little time to devote to other aspects of the business, except to avoid an unbalanced and slow-moving inventory and to maintain at all times an adequate supply of finished products in accordance with the sales demand.

In many instances it is not the simplest problem to reconcile the interests of the financial and sales divisions of a company with those of the production division, because the attitude of each toward the inventory, which is the connecting link, is liable to be diametrically opposed. In some cases it would seem that the production division is unduly restrained on both sides from achieving the economies that the circumstances might offer if greater freedom of action were permissible. Even if each phase of the business seems to be efficiently managed, is it logical to assume that the corporation as a whole is equally efficient when its achievements are measured by its earning power? Team work between all divisions is an essential of success. An increase in the apparent effectiveness of one division may in the end place some obstacle in the path of another. Coördination of finance, sales and production is vital and requires, except in extraordinary cases, a perception and an ability to analyze that comes only with an engineering training. Executives with a practical turn of mind find it more difficult to handle problems of this nature because the interrelation of the various factors permeates the whole organization and obscures the real issue at hand. It is a comparatively simple matter to analyze a single problem and to determine the one best way of securing the greatest efficiency for each separate case. However, as soon as the problem involves a number of related divisions, it is more difficult for the ordinary executive to know how to proceed.

The Economics Department at the Institute has undertaken a program of research in Management, the purpose of which is to analyze the more obscure problems of industry, and to bring to light those factors which are most perplexing in order that the industrial executive may be properly informed as to their true relationship. With this greater knowledge, it is hoped that the uncertainties of Management may be more readily overcome and the executive who is not supposedly a student of

Management, will be able to devote his energies more successfully to the immediate needs of the business. With this purpose in mind a study has been made of the relationship which was believed to exist between the size of a production lot, the sales demand and the ultimate earning power in terms of the capital invested; to see if the desires of both the sales and financial interests could not be utilized to supplement the production activities rather than oppose them as is found to be the case in many instances.

Industries which have been able to adopt continuous lines of production have been able to achieve a high degree of coördination because, when raw material can be made to flow through a sequence of closely related manufacturing operations without interruption, so that it emerges as a finished product at a rate equal to that of the sales demand, the inventory problem together with that of machine change-over is automatically dispensed with. A company or an industry whose products are manufactured in this manner is fortunate indeed. In most cases this has been achieved merely through the appreciation of the opportunity for mass production which is an outcome of the enormous purchasing power of this country.

What about those industries or companies who are less fortunate and cannot adopt such methods owing to a wide diversification of products, or lines of goods which must be supplied in a variety of sizes to a more or less limited market? The volume of business which exists in such cases for any single item of their products will not permit continuous manufacture. Style change and design obsolescence may also play an important part in determining the best method of production because, if inventories are allowed to build up and the demand shifts, a large number of unsaleable articles will be left on hand. Moreover, the additional amount of capital which may be required to carry on a larger scale of production is not available and the financial position of the company may not warrant the borrowing of funds from the outside.

In any of these cases, intermittent methods of production will continue to exist. This means that any unit of production must be manufactured in lots or quantities of convenient size. Each time such a lot is processed the manufacturing equipment must be set up and later dismantled, which, together with production control, creates a charge which must be prorated to the entire group of articles. Such a process will continue until a sufficient quantity has been placed in stock to supply the anticipated sales demand for a reasonable time. Then it must be stopped and the equipment shifted over to the production of other articles of a related nature until the stock of the original article has been reduced to the order point: whereupon the cycle will repeat itself. If the size of the lot be too small, the ultimate unit cost will be increased out of all proportion to the simple manufactur-

ing cost consisting of the cost of raw material, direct production labor and overhead on direct production time. If the lot be too large, inventories will be built up and the rate of capital turnover consequently decreased.

Where should the production executive draw the line in determining the best lot size? The financial executive will insist upon small inventories, rapid turnover of capital and low cost. The sales executive will demand an attractive and diversified line of products, of which there must be at all times an adequate supply, and an opportunity to market them at a low price to meet all competition. The production executive desires a large and uniform volume of business, standardized lines of products with the least variety so that he can simplify his production, avoid waste and idle time and obtain the lowest cost. Can these various interests be reconciled? It is necessary to the very life of the business, especially of this less fortunate type, that it be done, and yet not always is the relationship of the contributing factors sufficiently evident.

Here it is that research can aid Management. It has been found that an economic balance must exist between the unit allotment of the total preparation costs and the unit cost of carrying articles in inventories, in order to insure that the ultimate unit cost of the product will be the lowest attainable under the circumstances. It can be made a minimum when these two factors are equal. In the beginning it was believed that the cost of capital invested in inventories was the only factor that need be considered as offsetting the preparation charges. This is far from true because a similar charge arises from capital invested in work in process as well as the cost of the storage space occupied by articles held in inventories, both of which must at times be included. Upon this basis a mathematical expression can be evolved which will automatically take into account the controlling factors, and, when solved for a specific case, will indicate the size of the lot which will best satisfy the conditions.

This quantity has been designated as the minimum cost quantity and to all appearances should be the ideal for the lot size, from the production executive's point of view. However, it may entail a large expenditure of capital to which the financial executive will object. Research has again provided an answer which justifies the fact that a corporation with the highest rate of capital turnover is known to have a greater return on the investment. Taking the minimum cost quantity alone, one might believe that the reverse was true. Low production cost is not the ultimate goal; in reality the rate of return which is normally expected as a reward for undertaking the risks of business is the measure of success looked for by the capitalist and owners of the business, and not low cost unless it contributes to a greater return. It can be demonstrated beyond any doubt that there is one quantity smaller than the minimum cost quantity for which an equal return can be earned, even in the face of higher production costs. This may seem to be a paradox, but actually it is not, because the rate of capital turnover can be increased at the same time by such an amount that the increase in unit costs becomes of no consequence. This being true, the smaller quantity should be the one to use in determining the lot size and it is known as the Economic Production Quantity.

If there are two lot sizes which will yield the same return on invested capital there must be a range of quantities between them for which even a better rate of return can be earned. It might seem advisable to seek out that quantity which would yield the greatest return, but here again one gets into conflict with the various subordinate interests of conducting the business and is liable to sacrifice flexibility for a rather hypothetical gain. It is of very much more importance to utilize this range as a means of coördinating sales and production with the economic use of capital, than to try and gain the last dollar of profit. It is doubtful whether this could be achieved as the added effort and cost of control might more than offset the apparent possibilities. This economic range can be used to better advantage as a guide for coördinating production schedules and sales programs, as it provides means for simplifying departmental routine.

To the practical minded executive any methods that have savored of mathematical mysteries have always been unintelligible. A formula seems to be something to be avoided because they believe it leads to tedious calculations and inflexibility. A prolonged study of actual cases where Economic Quantities can be utilized has shown that the fundamental formulas can be simplified to a marked degree to suit any specific case, because there is usually one element which is the controlling factor. From the surface it is difficult to determine which one it is, but a simple test can be applied which will indicate to what degree approximation is permissible. When the appropriate form for both the economic quantity and the minimum cost quantity have been selected, it will apply in many similar cases, and when the limits of the economic range of the lot size have been calculated for a product or its component parts, no further calculations are required unless the product or process is radically changed. Even changes in the sales demand can be accounted for by a factor which obviates any recalculation.

The principles underlying economic lot sizes are not limited to production control. The process engineers can utilize the theory in analyzing production in order to determine the most effective process or plant layout and to decide what equipment should be employed. In some instances it may be found that if the lot size is large enough, an intermittent process can be transformed to a continuous one should the savings from the elimination of machine setups equal the cost of the equipment while it may remain idle. In this way the ideal condition can be approached and once the transition has been accomplished, it is not so difficult to rearrange other factors affecting the storing of goods so that the full advantage of a continuous process can be realized when the volume of sales permits. Remarkable savings can be achieved through the use of economic lot sizes even though the change in the unit cost of the product is relatively small. It is the cumulative effect of coördination and synchronization that counts in the end, especially when management can be provided with accurate means of measuring the extent to which any policy may be carried, and the effect it will have on other parts of the business. Situations such as this provide evidence that management which has always been thought intangible in nature can be transformed into one of the more exact sciences by a studious application of the engineering method.



THE TREND OF AFFAIRS



Disaster

TWENTY YEARS of scientific meanderings — in her six previous cruises she logged 291,000 miles — came to an end with the explosion and burning of the unique yacht *Carnegie* at Apia, Samoa. Dispatches give no reason for the blast which killed Captain James Percy Ault, her master for the past thirteen years, and which was followed by a fire that spread to five other craft moored nearby, destroying all of them. Not since the tidal wave of 1889 has Apia Harbor witnessed such a disaster.

The *Carnegie* is a total loss, only her cash and ship's books being salvaged, but, since she had been at Apia several days, it is presumed that all of her latest data had been mailed. Built in 1909, the yacht was operated by the Carnegie Institution of Washington, the same great combination of research departments which includes the Geophysical Laboratory and the Mt. Wilson Observatory. She was designed primarily to map the earth's magnetic field after plans worked out by the Department of Terrestrial Magnetism under the directorship of Dr. Louis A. Bauer.

Necessarily she had to be constructed almost entirely of non-magnetic materials. Her rigging was of hemp instead of steel wire; her anchors were of manganese bronze instead of iron; eleven-inch manila cables took the place of anchor chains; locust tree nails, copper and bronze bolts, and composition spikes constituted the fastenings. Her keel and hull were sheathed in copper and sixty-five tons of pig iron served as ballast.

She carried 12,900 square feet of plain sail, with rigging of special Russian hemp and all metal work on spars, rigging and blocks being bronze or gun metal. Cooking ranges and the refrigerating plant were constructed of bronze and copper, the cutlery of Mexican silver. Even the buttons on the crew's uniforms were of bone or brass.

Although she was first of all a sailing ship of brigantine rig, the *Carnegie* was equipped with a gasoline 150-horsepower engine, built practically of non-magnetic materials, chiefly bronze and copper and non-magnetic manganese steel. Length over-all the *Carnegie* measured 155½ feet, with a beam of 33 and a mean draft of 12 feet, 7 inches. She displaced 568 tons.

In fulfilling the purpose for which she was designed, the *Carnegie* was on her seventh cruise, having previously crossed and recrossed all the Seven Seas many times and

visited both the North and South Polar regions in quest of data. On her maiden voyage it was found that mariner's charts for the North Atlantic were seriously in error, with the result that transatlantic vessels were traveling considerably north of their true course. Later in the Indian Ocean were revealed errors in steamship routes amounting to four and, in some instances, to six degrees.

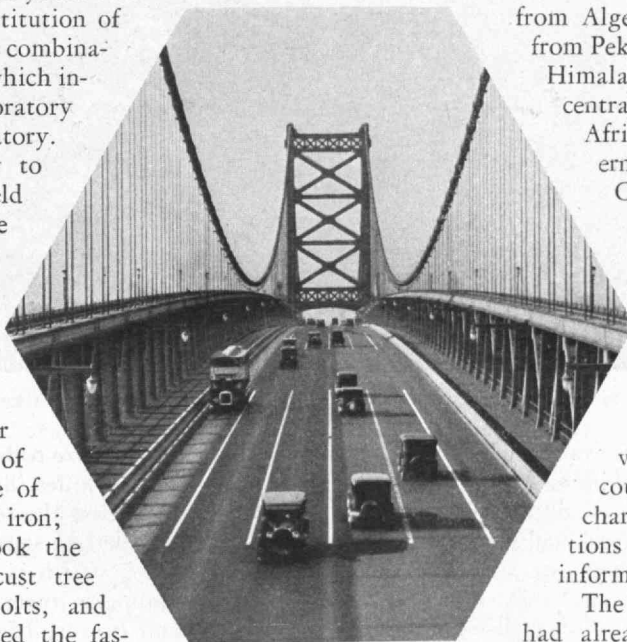
To map completely the earth's magnetic field, supplementary land expeditions were organized. These parties, 170 in number, acting under the direction of the Department of Terrestrial Magnetism of the Carnegie Institution, made observations at about 5700 points, involving traveling more than a million miles. They penetrated remote parts of the globe, often amid great difficulties and dangers. Among the most notable of these expeditions

were: the complete crossing of the Sahara from Algeria to Nigeria; a caravan trip from Peking to Turkestan and across the Himalayas to India; the crossing of central Australia; the crossing of Africa in the equatorial and southern regions; hazardous journeys in Central America and South America and into the interior of Asia Minor and Persia; and extensive expeditions by canoes into the little explored regions of British America. Leading hydrographic and scientific establishments were supplied with the data, without charge, as fast as these could be transferred, so that chart and map makers of all nations might promptly profit by the information.

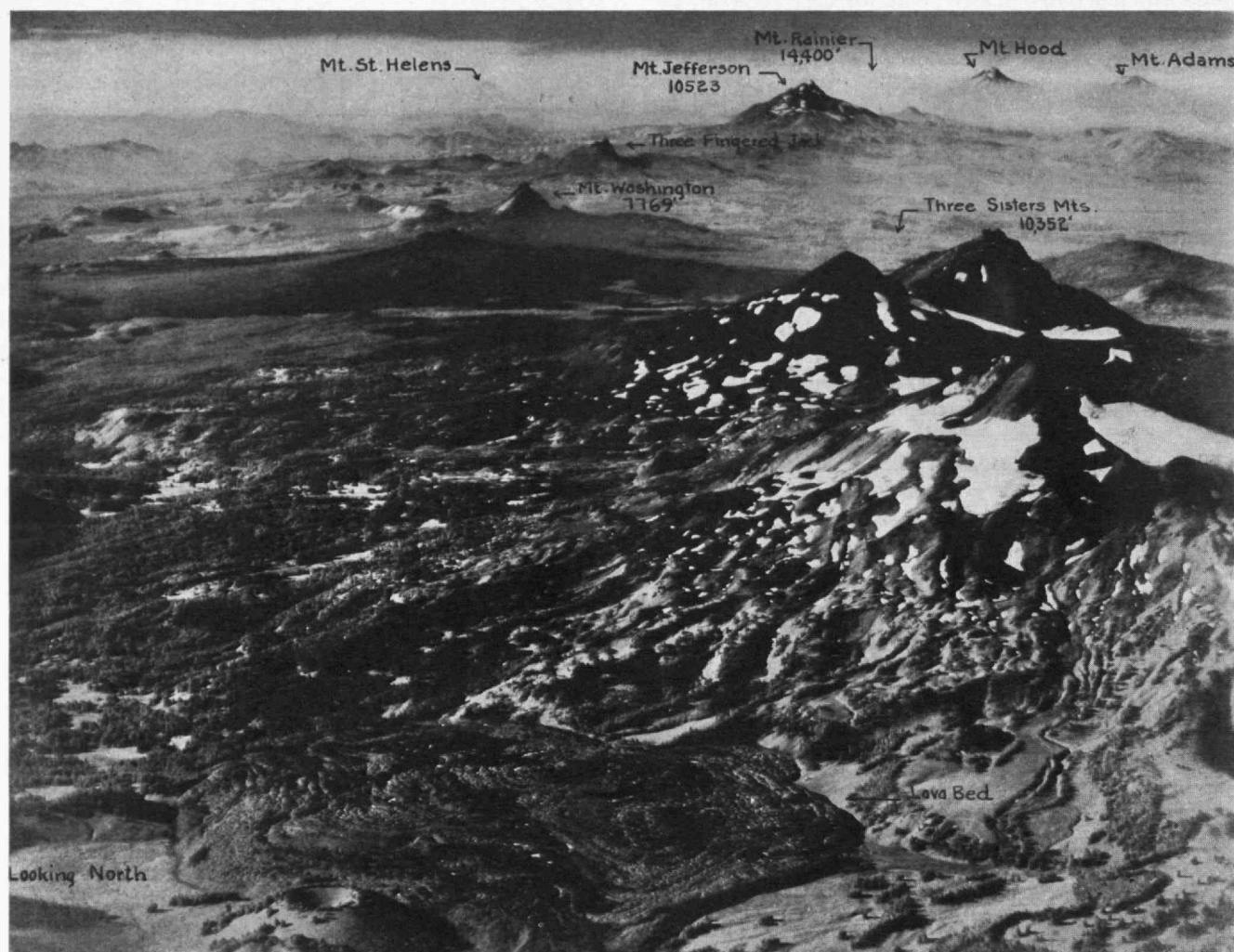
The cruise which ended in disaster had already resulted in the finding of two submarine mountain ranges off the coast of South America last February. One, extending 10,000 feet above the ocean floor, was encountered off Ecuador and the other off Chile. Definite proof had also been obtained, according to Captain Ault that the North Magnetic Pole, ordinarily regarded by mariners as fixed, was "wobbling."

214-Mile Look

ON SUCCEEDING PAGES are reproduced two remarkable photographs taken on the Pacific Coast last summer and now released for publication by the Air Corps of the Army and the Eastman Kodak Company. They represent strikingly advances made in the chemistry and physics of optics and in flying skill. Barely ten years ago any photograph taken from an airplane was uncommon enough to attract attention from the mere fact that it was an airplane photograph.



H. Armstrong Roberts



MOUNTAINS OVER TWO HUNDRED MILES FROM THE CAMERA ARE HERE VISIBLE. SEE THE STORY OF THESE REMARKABLE PICTURES ON PAGE 141

One year ago in these columns was recorded the fact that Captain Albert W. Stevens, piloted by Lt. James H. Doolittle, S.M., '24, had taken a photograph of the territory around Dayton, Ohio, from an altitude of 37,200 feet, showing the principal features of approximately thirty-three square miles of the earth's surface. To get it they experienced a temperature of -70 degrees Fahrenheit, had to use oxygen because of the rarefied atmosphere and, when the oxygen supply failed, both pilot and observer lapsed temporarily into semiconsciousness, but fortunately regained their senses and came safely to earth.

The present photographs were also taken by Captain Stevens, his pilot during a 14,000 mile tour of the Pacific Northwest being Lt. John D. Corkille, one of the most experienced flyers of the Air Corps. In the 214-mile picture, the Three Sisters Mountains are shown in the foreground fifteen miles away, while successively in the distance are Washington, Three Fingered Jack, Jefferson, Hood, St. Helens, and Rainier. Rainier is in the State of Washington, and the picture was taken from well south in the State of Oregon. The photograph on page 143 looks south, over the Siskiyou and into California, showing Shasta's snow-covered summit.

Many of the mountains clearly shown in the photograph are beyond the distance the eye can see. The atmosphere even under most favorable conditions

contains sufficient haze to limit good vision to much less than twenty-seven miles. But these long-distance photographs were made on film sensitive to the invisible infrared rays that penetrate smoke and haze. In the 214-mile picture, Rainier (which is clearly shown in the actual photograph) appears lower than the other mountains to the foreground because of the curvature of the earth's surface, although in reality it is higher. Because Captain Stevens could not see his objective, he was obliged on the various days when photography was attempted simply to point his camera in the direction of Rainier and await the development of the film to determine his success.

The photograph shown looking north was made from an altitude of 17,000 feet above a landmark which could be identified on a map. The distance of 214 miles was measured on the map from the mountain to the landmark. Because of the fact that the heavy forest fires this year served to increase greatly the haze, it is believed that, if an attempt were made to take the photographs before the season of forest fires begins, utilizing the same photographic materials used in this flight, even a greater distance range could be covered.

In addition to the photographic data gained on this long-distance picture expedition, it is thought a study of the results may yield important measurements relating to the curvature of light around the earth.

The airplane used on the flight was the CO-8 (DeHavilland fitted with Loening Amphibian wings) powered with a Liberty engine and having a gas capacity of 130 gallons. The camera was an Army K-6, using an Eastman 500 mm. focal length lens, Kryptocyanine hypersensitized film, and red filter.

The great value of high altitude or long-distance photography in time of war is obvious. It would mean the ability to secure layouts of enemy territory far beyond the reach of enemy anti-aircraft artillery. But the value extends to peace time work also for any information which will result in higher haze penetration photography applies to obliques as well as vertical high altitude work. And in oblique photography increased penetration means the possibility of mapping far greater areas in a single operation with the use of the four- or five-lens Army mapping cameras.

Super-Telescope

IMAGINE THE PUPIL of the human eye enlarged to a diameter of sixteen and two-thirds feet and then endowed with both magnifying power and the cumulative light-collecting capacity of the photographic plate. Imagine such an Olympian, piercing eye and you will visualize the great telescope that is now being planned and built for the California Institute of Technology. It is to be only twice the size of the Hooker telescope on Mt. Wilson, although Dr. George Ellery Hale, '90, whose genius is responsible for both the Hooker and the proposed one, estimates that it will be ten times as powerful as the Hooker; and Dr. Harlow Shapley, Director of the Harvard Observatory, predicts that it will furnish data to solve at least one-third of the major present day astronomical mysteries.

The optical equipment of the new telescope, its most vital part, presents a formidable scientific and engineering problem. It is to consist of a concave mirror, 200 inches in diameter, parabolically focused to converge back to a focus the parallel rays of starlight that fall upon it. The face of the mirror, to do this, must be highly reflecting, and accurate in form despite temperature variations.

These variations would seriously distort so large a mirror if it were made of glass as are most mirrors now in use. When grinding is done on glass, friction heats the mirror, and it must be allowed to cool before it can be tested. When its figure has been completed slight changes in temperature produce bad distortions in the image seen in the instrument.

Although glass is a great improvement over the speculum metal used by Herschel and Lord Rosse, it nevertheless seems imperative to find some other material of which to construct the 200-inch mirror. Gerard Swope, '95, President of the General Electric Company, offered the facilities of the General Electric Research Laboratory



Army Air Corps

CRATER LAKE, FIVE MILES IN DIAMETER, TAKEN TWENTY-FIVE MILES AWAY

at Lynn, Mass., for the solution of the problem; and Dr. Elihu Thomson, Life Member of the Institute's Corporation, its director, together with Mr. A. L. Ellis, have already achieved notable success.

"... It is not glass we shall use," says Dr. Thomson, "but fused silica or melted quartz melted in an electric furnace at between 1700 and 1800 degrees Centigrade, which means more than 3000 degrees Fahrenheit. . . . The method we shall use, and which we are using, in fact, on a small scale with great success, is, in general terms, one devised quite a number of years ago, and which consists in first melting a mass of good clean quartz sand in a circular mould in an electric furnace, and obtaining thereby a disk or thick slab of melted quartz sand. This,

indeed, is fused quartz, but full of tiny bubbles, which tend to make it lighter, but the melted sand has all the desirable properties of the solid fused quartz itself." Quartz has the advantage that it retains practically constant size for all ordinary temperatures. This makes a quartz mirror easier to figure, and to use after completion. The rough quartz disk, however, full of bubbles, will not take the smooth silver coating that is required to bring the light rays to a focus.

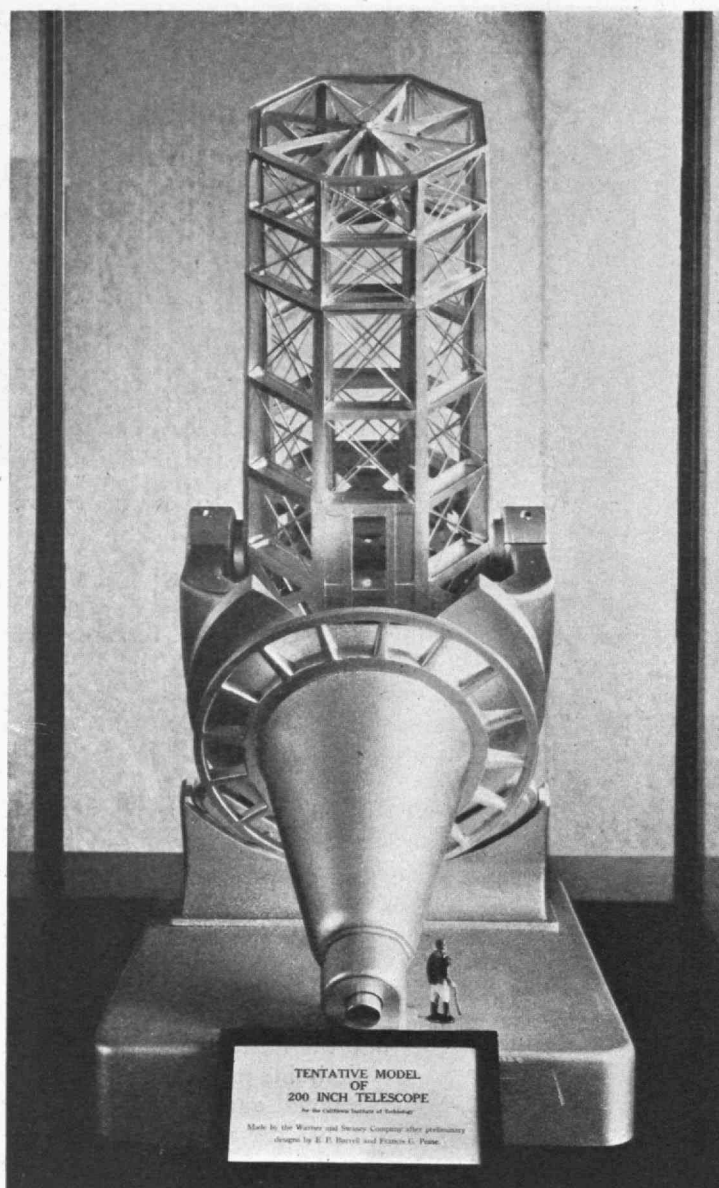
"This comparatively rough, bubble-filled mass of melted sand, which is the underlying disk, has to be provided with a surface layer of clear, glass-like, fused quartz, or silica glass. It will have the same general properties, as far as expansion goes, and, therefore, will suit the purpose very well united to the sand backing.

"The first efforts were made by melting on to the fused sand backing slabs of clear quartz made in a different way, and the results were fairly successful. Fair mirrors could be made in that way, but at the suggestion of one of our skilled workers, an experiment was made of feeding into an oxy-hydrogen blowpipe flame, granulated or finely powdered crystal quartz (rock crystal) of high quality, and immediately it was found that a coating of clear



P. & A.

THE GERMAN G-38, LARGEST OF LAND PLANES, DESCRIBED IN THE REVIEW LAST MONTH



TO WIDEN THE BOUNDARIES OF HUMAN KNOWLEDGE. SEE PAGE 143

quartz could thus be deposited upon any other piece of quartz. When oxygen and hydrogen are burned together in a jet, the temperature of the flame is high enough to fuse silica, or quartz.

"By raining down through such a flame, the granulated crystal quartz is received on a surface much as ice deposits in clear layers on objects during a sleet storm. As illustration, I often use the analogy, only adding that ours is a high temperature sleet storm, with quartz deposited in clear layers instead of ice.

"Extending this to a mirror, it was found that under proper precautions of temperature, the surface might be glazed with clear fused silica to an ordinary desired thickness, by the simple process of introducing high grade silica into a flame of such temperature as will melt readily the particles of silica as they pass through it towards the surface which receives it. In this case, of course, it is the surface of the mirror to be, as composed of the fused sand backing, which in the way I have outlined is covered with a layer of beautiful, clear, transparent fused quartz."

Quake

NOW that the tellural readjustment, which on last November set the northeastern section of the continent a-trembling, has passed the dish-rattling and chimney-shimmying phases of public interest, new and more significant effects are transpiring. A score of unemotional seismographs recorded the stirring of the slumbering earth and seismologists have made learned calculations. A red pin, stuck on the map at a dreary spot in that forbidding gray stretch of the North Atlantic that harbors the Grand Banks, they name the center of the disturbance.

Northwest of the pin is a note on the tidal wave which caused loss of life and great damage on the coast of Newfoundland. Eastward it is recorded that cable communication between America and Europe was interrupted on several lines, and that cable ships steamed out to make repairs. They found the damage greater than was at first suspected. Breaks in the cables were found over an area 400 miles southeast and 300 miles northeast of Halifax, Nova Scotia, and in some instances several breaks were found in the same cable over a distance of 100 miles.

These facts, and reports from mariners that soundings in carefully charted waters have changed, indicate a far-reaching shift in the floor of the North Atlantic, particularly on the continental shelf, which on the New England coast extends some 200 miles off shore before it slants quickly into the darker depths of the Atlantic. The possibility of slides on the slopes of the mountains of the deep has been suggested. Soundings taken off the American coast by Captain David W. Bone of the liner *Transylvania* found no bottom at the familiar 100-fathom line and, in three casts of the lead, the weight each time sped down and snapped off at the end of a taut line. Captain Bone believes the edge of the continental bank at the 100-fathom

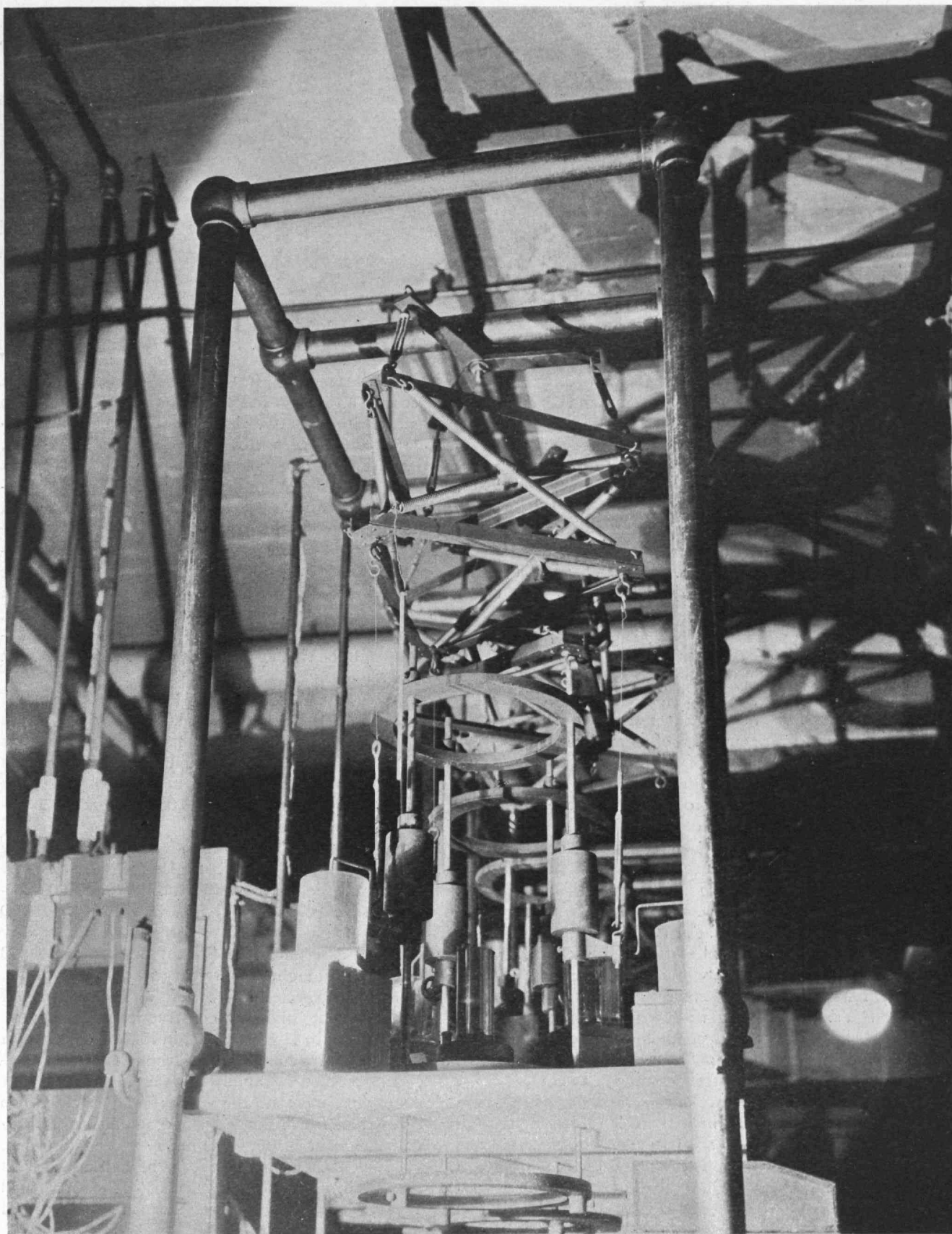
line, one of the mariner's most reliable under-water "landmarks," has shifted, and that new soundings should be taken at once for the benefit of the navigators.

Unlike the San Francisco earthquake, which had a characteristic horizontal movement, the recent seismic disturbance on the Atlantic coast apparently caused a vertical shift along a vertical plane, a possibility indicated by the formation of a tidal wave.

Terra Incognita

ECHOES OF EARTHQUAKE TALK had hardly died away and public attention was still focused upon the mysteries of earth-crust readjustments when Dr. Harlow Shapley, (*vide supra*) Director of the Harvard Astronomical Observatory, suggested that mankind lift its eyes to the heavens for the answer to universal secrets.

Speaking in New York in a series of lectures under the general title of "Flights from Chaos," Dr. Shapley, earnest worker, still a young man, yet one whose knowledge

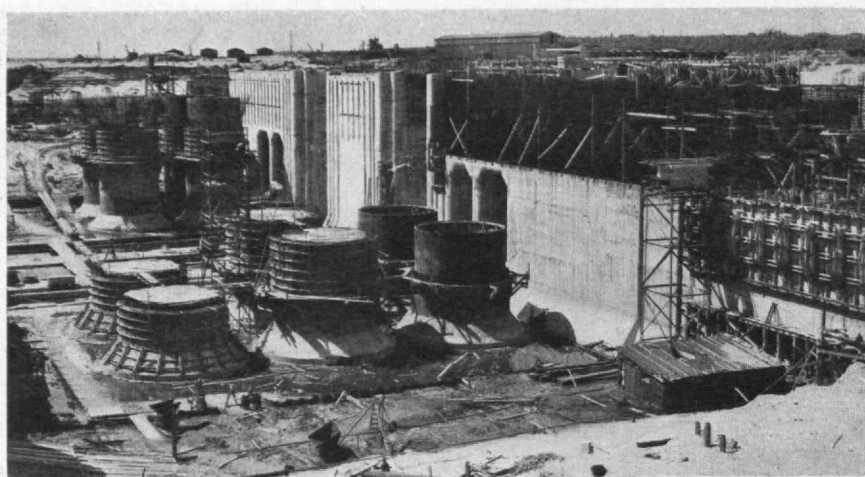


Davis

SHADOWS IN A RADIATION LABORATORY

A JULIUS SUSPENSION AT THE INSTITUTE. IT IS MOUNTED ON A CONCRETE PIER, SEPARATE FROM THE REST OF THE BUILDING, SO THAT THE DELICATE INSTRUMENTS SUPPORTED BY IT ARE UNAFFECTED BY SHOCKS AND TREMORS. SEE D. C. STOCKBARGER'S ARTICLE NEXT ISSUE

PROGRESS ON NORTH SEA CANAL LOCKS, IN HOLLAND. THE NEW WATERWAY ACROSS THE PENINSULA TO AMSTERDAM WILL ACCOMMODATE LARGE OCEAN LINERS AND THE LOCKS ARE LARGER THAN THOSE IN THE PANAMA CANAL. CURRENT WITH THIS WORK IS THE BUILDING OF A TWENTY-MILE DYKE ACROSS THE NORTH SEA CHANNEL OR INLET TO THE ZUIDER ZEE TO RECLAIM HALF A MILLION ACRES OF LAND



Ewing Galloway

of the stars is considered as profound as that of any of his contemporaries, ventured some interesting and amazing theories.

He suggested that in meteors and meteorites man may find new and important knowledge of the origin of the universe. Man's contact with the outside universe comes only through two media, light and meteors, and meteors which filter down through the atmosphere might well be analyzed in the chemist's test tube and torch. Several thousand million meteoric particles collide with the earth's atmosphere every day, but all except the largest and slowest are burned by the heat of friction in their flight.

Prolonged studies of the numbers and motions of meteors, also known as shooting stars will, Dr. Shapley thinks, contribute a test of the theories of the origin of the earth, particularly in the planetesimal hypothesis, in which the planets are one class of meteors. There is a close relation between clouds of meteors moving across the solar system, and the beautiful nebulae of the Milky Way. The nebulae are believed to be factors in the evolution of stars. Therefore studies of meteors should help to interpret the nature of the nebulae and their rôle in the evolution of stars and planets. Studies of the brightness of shooting stars, for instance, indicate that the earth's atmosphere some fifty miles above the surface is approximately the same temperature as at the surface itself.

During his lecture Dr. Shapley showed his audience a small and adventurous stone which, having started its meteoric flight through space some 10,000 million years ago, finally caught up with the earth which trundles along at twenty-five miles a second, and stayed here. Its speed through space, Dr. Shapley said, was thirty-five miles a second, and the fragment was one of a shower of meteorites. This fragment reached the earth at a spot in Central Poland in 1867 and, in its hard little heart, lies the answer to the riddle of the nature of the material universe in the days before this earth and other planets had come into existence.

The Open Road

PRELIMINARY REPORTS indicate that over 160,000 miles of the 325,000 miles of improved highways in the thirty-six states in the snow belt are being kept open this winter at a cost of \$6,500,000. This winter's snow

removal mileage is 35,000, or twenty-eight per cent greater than a year ago and 43,000, or nearly thirty-seven per cent, greater than two years ago. The American Automobile Association, which is behind the movement, estimates that every \$100 spent in snow removal yields \$1,000 in more efficient transportation and business continuity and, on this basis is reaped an economic benefit in excess of \$65,000,000.

Three-quarters of the population and practically seventy per cent of the nation's registered vehicles are domiciled in the snow belt. From this the Association deduces, based on an average value of \$1,000 per vehicle, that a motor transport investment of more than \$17,000,000,000 would be tied up unless the highways were kept open for travel.

Strange to say, Arizona has 282 miles to keep open. It has the smallest mileage of any state, New York with 25,028 being largest. The cost per mile (the latest figures are for 1926-27) averages \$45.18 and ranges from \$6.40 in Virginia to \$136.32 in Wyoming. In the relentless battle 6,865 trucks, 2,557 tractors, and 3,061 graders are available for action when snow falls.

Further increases of snow removal mileage may be counted upon in the years to come for the output of new automobiles in the United States totalled 5,480,000 during the first eleven months of 1929 as against 4,601,000 during 1928 although the November output was twenty per cent under November 1928. Present forecasts assert 1930 production will be eighteen to twenty per cent below 1929.

But 1930 is expected to witness an expenditure of \$2,500,000,000 for highway construction and maintenance as opposed to \$1,800,000,000 in 1929. This program includes much new construction although Federal projects cannot proceed as rapidly as they have in the past unless Congress increases the yearly appropriation. The principal reason for this is that an accumulation of unexpended balances of earlier years has now been absorbed, thus the pace slackens to one that can be maintained with the annual allotment of \$75,000,000. However, road maintenance and new construction during 1930 is expected to keep 625,000 men busy.

Canada is also increasing her output of motor cars and is now exporting twice as many as she is importing. Production for the first ten months of 1929 was 248,376 or 12.3 per cent more than for the corresponding period of 1928. In the Province of New Brunswick alone revenue

from motor vehicles for the year ending October 31, 1929, exceeded \$1,300,000, or thirty-one per cent more than for the previous fiscal period.

Fewer cars in this country are now being bought on time, which seems a healthy trend for it is attributed partially to the more careful investigation of credit risks, stricter financial terms, and, perhaps, the lower prices of the cars. Anyhow sums advanced during 1929 by 338 finance companies, according to the American Motorist's Association, will approximate \$1,380,000,000 for 1929 when all returns are in. About seventy per cent of the loans are for new cars and slightly more than fifty-eight per cent of new cars sold are sold on credit. But during 1925, 68.2 per cent of all new cars and 62.8 per cent of all used cars sold were purchased on time payment plans.

Lithium

QUANTITY PRODUCTION of lithium in America seems assured. Lithium, it will be recalled, is a metal whose specific gravity is less than that of water: a chunk of it dropped in water will float like a cork until it disintegrates. Although recently produced commercially in Europe, it is still very rare in this country and has been selling for more than \$200 a pound. The new quantity production method developed by Dr. H. M. Partridge, Assistant Professor of Chemistry at New York University, makes it possible to place it on the market in ton lots at \$15 a pound.

Lithium is used in alloys and it loses its softness when combined with some other metals. It has been used to obtain a better tone in bells and its spongelike absorption of gaseous impurities has made possible the increase of lifting power of helium gas by some fifteen per cent. The American product, according to Dr. W. C. MacTavish, who announced its development at the New York Electrical Society, is much purer than the German, although its production is based upon German patents, plus methods devised by the University of New Hampshire five years ago by the late Professor C. James and Dr. MacTavish.

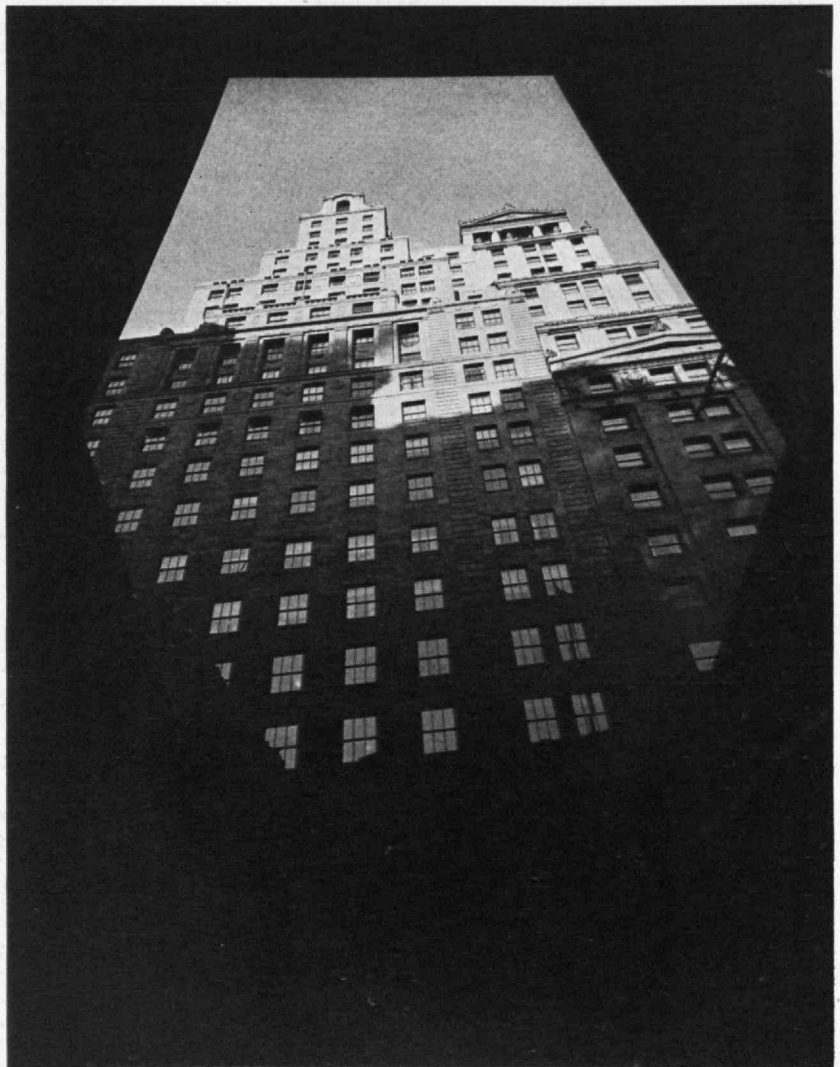
Steam vs. Hydroelectric

BECAUSE of the lower construction cost per kilowatt produced for the steam generating plants as compared to the small hydroelectric stations and the lowering of the price of coal, the percentage of total horsepower in the United States developed by water power has been steadily declining since 1925. In 1924, sixteen per cent of total horsepower installed was produced by hydroelectric plants; in 1925, forty-two per cent; in 1926, twenty per cent; in 1927, thirty-six per cent; in 1928, thirty-one per cent; and

in 1929, ten per cent. Eminent engineers maintain that this present trend toward steam power generation has been encouraged by the difficulties utility concerns have encountered in dealing with the Federal and State governments concerning valuable power sites.

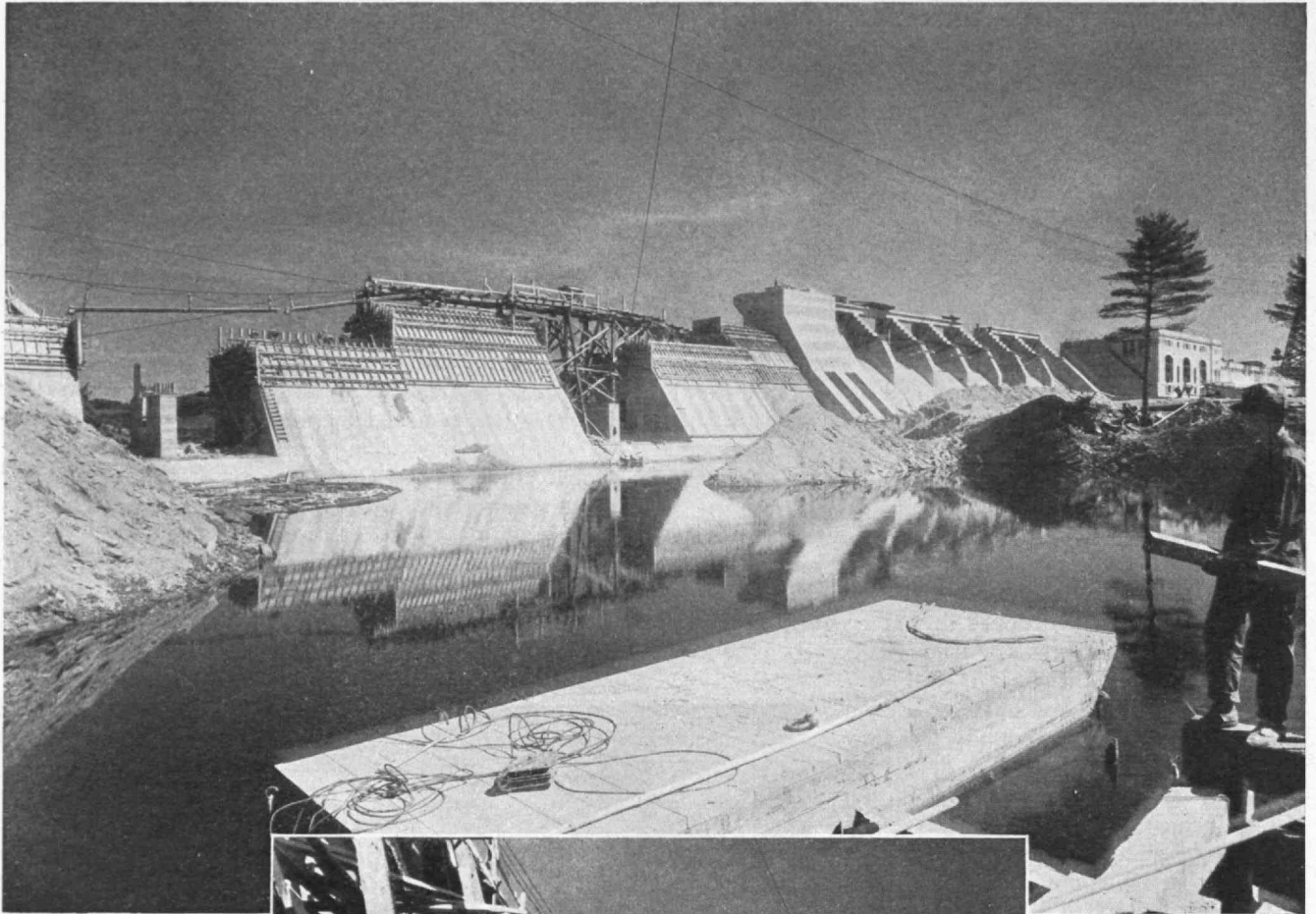
In 1924, the Northeastern Superpower Committee, under the leadership of President Hoover, made a comparative study of steam and water power production costs in generating electrical energy. Results showed that construction costs per kilowatt produced for modern high pressure steam plants was \$125; for water developments the magnitude of the St. Lawrence and Niagara developments \$100 per kilowatt; for smaller hydroelectric plants \$175 per kilowatt. This investigation pointed out further that the operation and maintenance cost per kilowatt-year of demand for steam plants was \$6.00 and for hydroelectric plants \$2.00. These facts point to the increased use of steam plants when fuel can be obtained cheaply.

These findings run counter to many current ideas held by the public. Prevailing opinion that water power is cheap power, that more and greater dams the country over will displace the production of power by steam, is predicated on lack of information or false information.



Ewing Galloway

BANK OF NEW YORK AND NATIONAL CITY BANK BUILDINGS
PHOTOGRAPHED THROUGH THE TOP OF A DOORWAY ACROSS THE STREET



*Central Maine Power
Company Dam near
Lewiston, Maine.
It is a part of the
Gulf Island devel-
opment on the An-
droscoggin River*



PHOTOGRAPHS BY PAUL
WEBER FOR MORTON C.
TUTTLE '96 COMPANY



The Blessings of Wealth

OUR BUSINESS CIVILIZATION, by James Truslow Adams. \$3.00. ix+306 pages. New York: *Albert and Charles Boni*.

THIS is an embarrassing book to review, for the reason that the author has done his work so well. The reviewer, when he begins to write, feels that, after all, he could do *his* work best by quotations from the author. To do this to the extent the reviewer would wish, would be unfair to the author; to the reader also, as it might induce him to forego the pleasure — and duty — of reading the book itself. If the young men of America will perform this duty there will arise a rebellion against our "business civilization" comparable to the revolt against dogma in religion and dogmatism in science which followed the publication of "The Origin of Species" nearly a century ago.

The author's thesis is that in countries, other than America, as a result of their historical development, there are social classes, or the remnants of classes, imbued with the idea, or the ideal, of *noblesse oblige*; while in America the obligations of inheritance are replaced by the idea — the *idée fixe* — that the whole duty, and pleasure, of man is "to gather wealth as quickly as may be, combined with a guarantee that society shall protect him in that wealth once he has gathered it" (p. 20).

The author quotes from Alexander Hamilton the remark, "made in a moment of vexation" and therefore less discreet than usual, that "The People, your People, Sir, is a great Beast." This, still the point of view of America's aristo-plutocracy, has been also expressed in the phrase, "The public be damned"; and more recently still in what might be called a Grundy-an form by one whose life has been given to the service of wealth. Indeed, it would seem that the power of "big business" and wealth so far transcends the former power of nobility and royalty, that the chief magistrate of our country, by merely stretching forth his hand, can restore prosperity to a doubting people and confidence to a stock market tumbling from the blue sky. And the "greatest Secretary of the Treasury since Alexander Hamilton," offers The People the "bread-and-circus" of a cut — *mirabile dictu* in the lower ranges — a cut in income taxes which will save each taxpayer a dollar or two — next year. In the meantime the taxpayer can invest his prospective savings, and thus help to restore the "confidence" he has lost. This is American *noblesse oblige*.

While not denying the blessings of wealth — properly distributed — the author shows conclusively that it is not equitably distributed; and least equitably to the classes upon which true progress, spiritual, intellectual, and artistic as distinguished from material progress, depends. While not denying that this evil exists in other lands, the author shows that in America it has become so universal as to be regarded not as an evil but as a good, not as a sin but as a virtue.

The idea that "profit" is the mainspring and end of all

endeavor has permeated all classes. Our universities and colleges, supported, controlled and owned by wealth, are teaching "business" and are practising business. They value equipment more than personnel, and administrative personnel more than teaching staff. They "sell" themselves to the public, not by worth, not by learning, not by truth, but by advertising. Teachers who refuse to bow down to Mammon pay the penalty, so that it can be said of one who fought to remove corruption from the government of one of our largest cities, "Although the public utility interests, which he estranged by his protection of the city's interests, were not strong enough to have him dismissed from his professorship, and although . . . he was never openly threatened, he was, nevertheless, held for twelve years without an increase on a ridiculously inadequate salary."*

Those who know the history of the relations between wealth and education will say he "got off easy." Moreover, many of his colleagues, those who have learned to bow down in the house of Rimmon, will call him a fool. And he would be a fool to a group of teachers, such as the writer knows, who have for their daily subject of conversation during the luncheon hours the rise and fall of prices on the stock exchange. To them Big Business has said what the Red Queen said to Alice: "I don't know what you mean by *your* way: all the ways about here belong to *me*."

All these things and more can be learned from Mr. Adams's book: the degradation of the clergy, the teacher, the artist, the architect, the musician, the writer, the physician, the lawyer, the farmer. Our great men used to be poets, scientists, statesmen, musicians, actors, artists. Now they are public utility manipulators, movie magnates, oil kings, auto kings, and the politicians whom they buy into office. All this and more the young man can, and should, learn by reading from the first chapter, *A Business Man's Civilization*, to the last chapter, *The Art of Living*, of Mr. Adams's book.

The book is fair, it presents all sides of the questions discussed, but above all it is truthful. It should be read even by that vast army of young men who have the ambition, the hope, too often delusive, to become a Rockefeller, a Ford, or an Al Capone.

Perhaps then good may come out of evil. The writer has read somewhere of a mediaeval scribe who catalogues "seventy-two princes and 7,405,926 devils, divided into 1,111 legions of 6,666 each." Now those devils have vanished from the earth. Perhaps in the year 2029, some scribe may write of the millions of "devils" who ravaged America and harassed its people a hundred years before. He may remark in conclusion that all those "devils," imps as well as Thrones and Principalities, have now vanished from the earth, driven out by the young men who passed from darkness into light.

L. MAGRUDER PASSANO

* Professor Charles Edward Merriam. See *The Nation* of November 27, 1929.

The Religion of Scientists

SCIENCE AND THE UNSEEN WORLD, by Arthur S. Eddington. \$1.25. 91 pages. Boston: *The Macmillan Company*.

THERE is at the present time a rather extensive and influential group of scholars with scientific preoccupations and religious interests. The names of Russell, Whitehead, and Eddington are perhaps the first to come to the attention of the religious reader. Of these Eddington, although perhaps the least versed in philosophical subtleties, is without doubt the most *au courant* with present scientific developments. It is consequently interesting to read this little booklet in which the religious aspect frankly takes priority over the scientific. In the opinion of the reviewer, the book falls upon one of the horns of the dilemma that is so fatal to attempts at a scientific theology; the dilemma, that is, of a conventional, quasi-personal theism and of the Spinozistic pantheism which is the real religion of most religious scientific men from the days of Lucretius to those of Einstein.

The honest scientist is always very careful to conserve some object for his religious emotions but finds himself unable to accept the usual hypostasized objects belonging to dogmatic theology. He is consequently compelled to project this emotion upon the world of his science and inevitably hits upon a religion which is without much emotional significance to the common man. Professor Eddington does not completely avoid this difficulty. On the other hand, in breadth of scholarly outlook, in interest of religious emotion, the book deserves the highest commendation.

NORBERT WIENER

Military Biography

LATELY biographies — especially the outpourings of that *soi-disant* cult of "modern" biographical writers, have glutted the bookstalls. Much is shoddy but such a quantity of literary effort inevitably includes something worthy of more than a passing glance. André Maurois in his *ASPECTS OF BIOGRAPHY* (Appleton) recognizes succinctly the difference between a Victorian and a modern biography. The former, he says, is "above all things a document"; the other "above all things a work of art." Each type has its merits and its faults, for "a bad Victorian biography is a formless mass of ill-digested matter; a bad modern biography is a book of spurious fame animated by a would-be ironic spirit which is merely cruel and shallow."

Accompanying the plenitude of biographical books are shoals of stories, mostly fiction, about the World War. Some seem to be as much the publisher's inspiration as the author's, but the welcome each newcomer gets indicates that a very real public craving for war copy now exists. Thus one may account for the many biographies of military persons included in current lists on the grounds that some at least were instigated to kill two birds with a single stone.

Scribner's gives us *FIELD MARSHALL EARL HAIG* by Brigadier General John Charteris with a foreword by John Buchan, while the late Generalissimo of the Allied Armies is presented in three distinct ways.

Major General Sir George Aston's *THE BIOGRAPHY OF THE LATE MARSHAL FOCH* (MacMillan), prepared from documents and facts obtained from French and British sources, while not a work of genius, is readable and far above the ruck of current biographies. The two other authors draw particularly upon their personal knowledge of their subject. They are Raymond Recouly, whose *MY CONVERSATIONS WITH THE MARSHAL FOCH* (Appleton) has been translated by Joyce Davis, and Major Charles Bugnet, whose *FOCH SPEAKS* (Lincoln MacVeagh, The Dial Press) has been translated by Russell Green. M. Recouly's book covers the period 1919 to 1928 and Major Bugnet, Foch's aide-de-camp, recounts memories of the man and general with statements of his views on war and peace.

Curiously a French soldier of an elder day also is now memorialized by three authors, although one of these books, *LAFAYETTE IN VIRGINIA* (Johns Hopkins), is a reprinting, with introduction and facsimiles of manuscripts, of hitherto unpublished letters and papers in the Virginia State Library and the Library of Congress. *LAFAYETTE AND THREE REVOLUTIONS* (Stratford) by James Simpson Penman deals with the triumvirate of upheavals in which he was a participant. Brand Whitlock's two-volume *LAFAYETTE* (Appleton) is an exhaustive account, a truly full-length portrait, and one of assured permanence.

Then there are two dedicated to the memory of contemporaries of Lafayette in the American Revolution: John Pell's *ETHAN ALLEN* (Houghton Mifflin) of whom it is claimed "he was more than a backwoods chieftain who emerged from the wilderness at the head of a band of uncouth adventurers, captured a fortress, shouted an epigram, and disappeared again into obscurity;" and *MAD ANTHONY WAYNE* (Scribner's) by Thomas Boyd.

Leaders in the Civil War are also rigged out anew for public consumption in 1929-1930. Colonel J. F. C. Fuller has made an analysis of General Grant's campaigns which Dodd, Mead have issued under the title *THE GENERALSHIP OF ULYSSES S. GRANT*. The endeavors of a lesser known strategist are presented in *HOOD'S TENNESSEE CAMPAIGN* (Walter Neale) by Thomas Robson Hay, while B. H. Liddell Hart, an English correspondent, views William T. Sherman as the military genius who contributed most to the downfall of the Southern Confederacy in *SHERMAN: SOLDIER, REALIST, AMERICAN* (Dodd, Mead).

But of all the current military biographies two are strikingly illustrative of the good writing now being produced. The first, *MARLBOROUGH, THE PORTRAIT OF A CONQUEROR* (John Day) is by Donald B. Chidsey, aged twenty-eight, who wrote the successful *BONNIE PRINCE CHARLIE* some time ago; the other is the work of Lieutenant Colonel F. E. Whitton, a British officer, whose *WOLFE AND NORTH AMERICA*, is presented by Little, Brown and Company.

Mr. Chidsey has pounced upon and dusted off old Jack Churchill, first Duke of Marlborough, whose career and amatory interludes he tackles with gusto. Here and there his paragraphs smack of fine writing, and at times his method of attack (especially the chapter titles) makes it seem as if Mr. Chidsey was obsessed by a fear his readers needed to be shocked or startled lest they hesitate to finish his book.

John Churchill (1650-1722) was at fifteen a page of honour to the Duke of York, at seventeen commissioned in the Guards, at twenty-three saving the life of the Duke of Monmouth when Maestricht was besieged, at twenty-eight married to Sarah Jennings, who was the favorite of Queen Anne, at thirty-eight a lieutenant general, a privy councillor, an earl, and one of the first to go over to the "Oranger," at forty-two in the Tower accused of treason, at fifty-two a Garter Knight and a Duke. Then came Blenheim (1704), Ramillies (1706), Oudenarde (1708), Malplaquet (1709).

A conqueror singular in his tact and skill in management of men, through his consideration for the welfare of his soldiers he held together for years an army drawn from every nation in Christendom. Yet he was a turncoat, and all that can be alleged in excuse of his scheming to serve two masters is that not one of his associates was without sin in this respect. Whether the book delineates Marlborough as he was, or Marlborough as Mr. Chidsey would like to think he was, is beside the point; it is a good, vivacious life-story and one quite favorable to the Duke's memory. It tends to be "a work of art."

Though James Wolfe (1727-1759) was not born until five years after Marlborough died, his father had served under the Duke in Flanders, and Wolfe's first campaign was on the Continent as an ensign in the 12th Foot at the age of fifteen. At seventeen he became a captain in the 4th Foot, at twenty-two a major and acting commander of the 20th Foot, at thirty Quartermaster General in Ireland, at thirty-one a brigadier under Amherst. Thus came about his brilliant opportunity, in 1758, at the Siege of Louisbourg, the great French fortress commanding the North Atlantic. Largely due to Wolfe's record in that successful venture, Pitt gave him the Canadian Expedition of 1759. The interval February 17, 1759, when he sailed from Spithead, and the following September 13 when he fell mortally wounded on the Plains of Abraham transformed James Wolfe from the status of a competent youthful major general to that of an immortal hero.

Colonel Whitton's book justifies being called "a document" of the Colonial history of North America — but not "a document" in any dull sense. His writing possesses the clarity of style and orderliness of presentation which are the earmarks of earnest writing by an able pen. He scorns to jazz his facts and scores tellingly by presenting the background of contemporary happenings which led to Louisbourg and Quebec. His story has a more lasting flavor than Mr. Chidsey's though he omits a bibliography. It is a fitting companion to the excellent JAMES WOLFE, MAN AND SOLDIER (Louis Carrier), by Professor W. T. Waugh, of McGill, which appeared last spring, handsomely dressed.

H. E. L.

City Planning

THOMAS E. TALLMADGE'S ('98) article last month, "Terraces and Towers," called attention to the great problems of traffic congestion that are resulting from the multiplication of skyscrapers in American cities. The ancillary problem of regulating the haphazard and helter-skel-

ter growth of American metropolitan areas is obtaining a great deal of attention from experts and from the public. The books appearing on this subject bear this out. Ralph Borsodi's THIS UGLY CIVILIZATION (Simon and Schuster, Inc.) states the difficulties that the human mechanism faces in the noise and crowds and smells and regimented life of ugly cities. Hugh Ferriss's THE METROPOLIS OF TOMORROW (Washburn) is one man's idea of how to make our ugly cities beautiful. Le Corbusier's THE CITY OF TOMORROW (Payson and Clarke) and Professor and Mrs. Hubbard's OUR CITIES TODAY (Harvard University Press) also discusses the problem, the latter much more practically than the others. These last two books will have extensive comment in subsequent issues of The Review.

D. Appleton and Company has just issued a new edition of CITY PLANNING edited by John Nolen, which for some time has been a standard handbook on the subject. It contains a series of papers discussing the essential elements of a logical, evolving city plan. Frederick Law Olmsted contributed the introduction, and there are eighteen other papers by leading American authorities including Arthur A. Shurtleff, '94, and Mr. Nolen himself, who is a prominent consultant in city planning and a lecturer on the subject at the Institute.

Goodspeed's Book Shop in Boston recently announced for sale a copy of an old town planning classic, Thomas H. Mawson's CIVIC ART (\$25.00).

J. R. K. Jr.

Glamour and Rust

OLD LOUISIANA, by Lyle Saxon. \$5.00. xvi+388 pages. New York: The Century Company.

TIDEWATER VIRGINIA, by Paul Wiltach. \$5.00. 326 pages. Indianapolis: Bobbs-Merrill Company.

IN history, romance, and charm Louisiana and Virginia are the most variegated and lovely of all the American states. It is a fitting and happy coincidence, then, that these two books appear at the same time. Steeped in the bizarrerie of three cultures — French, Spanish, and American — Louisiana today, half ancient and half modern, is a strangely fascinating remnant of old southern plantation life.

Virginia also offers a similar but better preserved picture of manorial glory, particularly Tidewater, that section contiguous to Chesapeake Bay which is reticulated with the major rivers of the state — the James, the York, the Rappahannock, and the Potomac. Like Louisiana, therefore, its history and economic growth has been influenced by water, in Louisiana by the ravenous Mississippi, and in Virginia by the estuaries of the Chesapeake.

Saxon feels the alliance between the history of Louisiana and the Mississippi as shown not only in OLD LOUISIANA but in his previous books FATHER MISSISSIPPI and GLAMOUROUS NEW ORLEANS. Having lived the most of his life beside the river, he possesses a mood saturate with the colorful adventures of his neighbors and their common dependency upon the great stream. In the first part of OLD LOUISIANA he recounts the break-up of plantation life. He recalls Kate Dangerfield on her great Arcadia Plantation — a magnificent horsewoman and an artist — and he describes her method for removing fleas from a bed.

She simply placed a woolly sheep upon it, whereupon the fleas, sensing the greater opportunity, emigrated to its body.

Mr. Wilstach, not an F. F. V. or even a native, but a man of Indiana and New York, is not less satiated with Virginia and enthusiastic about its greatness. "Here," says he, "the English made their first permanent settlement upon the American continent, here from the crudest pioneer conditions flowered a civilization, and here grew a race of philosophical and practical and patriotic statesmen through whom it contributed incomparably more than any equal area to the development of the idea of independence and to the passion for it; it was a leader in the activities of the Revolution; and it was the nursery of the great contributors to the constructive organization and practical operation of the new nation." In Tidewater met "the first thoroughly representative body on the continent." It was here that the first church of the thirteen colonies was erected, the first free school was operated and the first of all known American theatrical performances was given.

Slavery was first introduced in Virginia and, as in Louisiana, was responsible for the development of the luxurious and leisurely plantation era — "the period when the only system of running water in a house was a nigger with a bucket."

In the second part of his book Saxon records the beginning of Louisiana, the period of French exploitation, the golden age of Spanish society, and the territory's final passage into the hands of the United States by way of Napoleon. With the Louisiana Purchase came the American invasion and with it the ornate elegance of southern plantation mansions.

Saxon deftly intersperses in this historical account delightful vignettes of Louisiana life: the *Mistletoe Trail* describing the nigger trying to hunt down Santa Claus, the New Year's Eve party that Messy-Lena, the whole 300 pounds of her, has down at her cabin. He presents other incidents, too, such as Temba's murder of his master and Pauline's sadistic treatment of her mistress. The strange mixture of French, Spanish, American, Creole, Arcadian, nun, pirate and slave gives the book the variety and charm of an antique rug and always there is the black border, the slave system which held Louisiana society together.

The last part of Saxon's book describes a tour of Louisiana, with descriptions of the remains of Louisiana plantation life and houses. In general, it is a picture of rusted iron work and sagging windows. E. H. Suydam, the artist, made the trip with Mr. Saxon, and the thirty-three pencil sketches which he made en route and are presented in the book, are charming and appropriate. It is too bad that, in collating the book Saxon did not insert, in his references to these illustrations, any page numbers whatever. It would have been a simple matter to have given page references, but as it is the reader is forced to waste much time and energy searching for them throughout the book.

One of the most observable differences between Saxon's book and Wilstach's book is in the styles of each. Both styles express the romance of man's conquering a wilderness, but Wilstach's is somehow more exterior: he is more familiar with the outsides of plantation houses than the insides. But in spots he gives a fetching blend of

history and romance and at times he reveals the imagination and delicacy of a true artist in his picture of the Old Dominion. With orderliness and design foreign to Saxon's book he tells first of the white man's entrance into the empire of the humorless Indian, and then, in turn, deals with the various sections of Tidewater.

Saxon's style is atmospheric. Romanticist as he is, he writes in a twilight mood and as the soft colors of the evening treat a wrinkled face with kindness, so does Mr. Saxon's style adapt itself to the faded elegance of Louisiana.

The other chief difference between the two books rises from the difference between Louisiana and Virginia. The natural charm of Virginia is buttressed by its associations with such distinguished names as the Lees, the Randolphs, the Harrisons, the Pages, George Mason, James Madison, Patrick Henry, Thomas Jefferson, and George Washington. Louisiana lacks such names and the vista down the years is more dim and shadowy. Then, too, that element of Virginia pride which says "carry on" and results in restoration, finds its contrast in the Louisiana acceptance of decline.

E. P. K.

On Kitchi Gammi's Shores

SEVEN IRON MEN, by Paul de Kruif. \$3.00. xiv+241 pages. New York: Harcourt, Brace and Company.

THE seven iron men were Leonidas Merritt of Duluth, three of his brothers, Alfred, Lewis and Cassius, and three of his nephews, John, Bert and Wilbur. These seven of the Merritt family had most to do with the discovery and early working of the wonderful iron ore deposits of the Missabe district at the head of Lake Superior.

The book tells the story of the discovery of these Missabe ore bodies and a little of the working of the first mines. Leonidas is the central character. His career is followed from his childhood to his death in 1926 when "the City of Duluth went into official mourning for him for four whole days. He had no debts. He left no will. His fortune was stated . . . to consist of \$1,500 worth of household goods, \$800 miscellaneous and \$150 in cash." This is in contrast to the condition in 1893 after the ore bodies had been discovered and proved and some mining done. "Alf and Lon were called multi-millionaires by everybody. Young John E., up on the range, was pointed out by seasoned explorers with awe: he was known to have a standing offer of \$1,000,000 for his Mountain Iron stock but he only laughed at it."

The book consists of four chapters or parts, followed by thirteen pages of explanatory notes, seven pages of bibliography and an excellent index. Part one gives an excellent picture of the northern country, the hard pioneer existence, the difficulties of exploration and the discovery and opening of the Vermillion Range with its shipping port at Two Harbors.

Lon maintains his faith in the presence of ore in the low Missabe hills. Money obtained from white pine holdings is constantly used for new explorations. The character of the brothers and nephews is made plain to the reader, particularly that of Cassius, the careful woodsman and explorer, and at the end of the chapter ore is discovered. It is soft earthy ore, not hard hematite. It is

found in a basin, not an outcrop, against all the advice of the practical miners, but it shows an analysis of 64 percent iron. The date was November 16, 1890.

The practical miners refused to consider these bodies of ore as mines. Interesting reference is made to a Cornishman who sees no way to mine such material because it has no hanging wall or foot wall. Lon however discovers the proper way to mine such material by stripping the over burden with steam shovels and mining the ore in the same way.

Frick, Oliver, Carnegie, and the other steel men of the period come into the picture. There is great need for rapid development and the panic of 1893 shuts off the usual available sources of money. However, Lon and Alfred refuse to see difficulties and have great plans in mind, including ore docks at Duluth, a new railroad and thousands of ore cars. Mr. Rockefeller also comes into the picture. Lon goes to New York and in four months returns to Duluth not only penniless but heavily in debt with the whole family involved. This part of the story is within the recollection of most of the steel men now living. It led to a law suit and a Congressional inquiry. Mr. Rockefeller was fully exonerated. The only one to blame seems to be Lon with his overweening ambition and absence of business knowledge. A few years after in 1901, Mr. Rockefeller sold his interests to the newly formed U. S. Steel Corporation for \$68,000,000.

It is a wonderfully interesting story, particularly to engineers and those involved in any way in the making and using of steel. The main moral to be drawn is the value of persistence even at times in the face of expert evidence, because geologists and others were convinced no ore was to be found in the Missabe hills and swamps. A still clearer moral, however, is the great need for some training in the fundamentals of business. The author has evidently consulted many authorities. His book clearly shows wide reading and on the whole the story is well told. Possibly the inclusion of some statistics would have been helpful because the shipments of ore from the Missabe range have been enormous and are all on record.

GEORGE B. WATERHOUSE

The Insecurity Market

THE STORY OF WALL STREET, by Robert Irving Warshaw. \$5.00. 353 pages. New York: *Greenberg*.

MR. WARSHAW has taken to heart the Carlylean dictum that history be a collection of biographies. His survey of the development of the American stock market is, in the main, an account of the careers of the many unrelenting and unscrupulous stock market manipulators who have contributed to the market's reputation.

As Mr. Warshaw points out, the first speculative orgy in America was in January, 1790, when Alexander Hamilton's funding plan to redeem the so-called worthless "Continental" was presented to Congress. At that time, United States currency was selling twenty cents on the dollar and consequently permitted the "insiders" and "lobbyists" to reap large fortunes.

Previous to 1865, when the corporate form of organi-

zation came to be commonly used in this country, the development of fortunes in Wall Street was dependent upon corrupt legislation as well as acute business judgment. But this era of corporate organization permitted active public participation in Wall Street with the consequential demand for honest legislation and constructive business leadership. This demand was adequately filled by Hill, Harriman, Morgan, Schiff, Carnegie and Rockefeller, who by sheer organizing and executive ability forced themselves to be recognized in Wall Street. It has been mainly due to their foresight, energy, and greed that the railroad, banking, steel and oil industries have been developed from humble pursuits to multi-million dollar enterprises.

The present day American speculator can learn a valuable "hands off" lesson from the lives of the Wall Street manipulative operators discussed by Mr. Warshaw. To stress this point the author says "For in Wall Street the keen bird eats the worm but the bigger birds eat them."

Mr. Warshaw's book is not as colorfully written as Mr. Fuller's biography which relates in novelized form the romping rise of Jim Fisk from a poor son of a Vermont peddler to a Wall Street magnate.

R. T. J.

Brief Reviews

THE RADIO MANUAL, by George E. Sterling. \$6.00. vii+666 pages. New York: *D. Van Nostrand Company, Inc.*

WE would now be making a different comment upon this book, if, after assembling all of this useful information about practical radio for publication between a single pair of covers, the author and his collaborators had edited the manuscript with the thoroughness it deserved. The reader has a right to demand of a reference book, especially of one calling itself a "manual" or handbook, that the information in it be readily accessible. "The Radio Manual" does not meet this simple requirement. It has no uniform set of symbols and even the text references to these symbols vary from page to page; it has no reference list of symbols to help the information-hunting reader; and, what is far more damning, the index is woefully inadequate. As a result, what might have been a good and much-needed handbook, is just another unorganized book about radio of which there are many others.

AIRPLANE STRUCTURES, by Alfred S. Niles, '17, and Joseph S. Newell, '19. \$5.00. xi+413 pages. New York: *John Wiley and Sons, Inc.*

DEDICATED to Professor Charles M. Spofford, '93, Head of the Department of Civil and Sanitary Engineering, this book reflects credit on the work given in that Department. The purpose of the authors is to apply the fundamental principles of structural theory to practical airplane design. Mr. Niles is now Professor of Aeronautic Engineering at Leland Stanford Junior University while Mr. Newell is an Assistant Professor at Technology.



Annual Dinner

JANUARY 18 has been selected by the President of the Alumni Association, Paul W. Litchfield, '96, as the date for the Annual Alumni Dinner, and Walker Memorial has been chosen to house it. For the first time since 1925 this official banquet of the Alumni Association returns to Institute grounds.

The Committee on Assemblies has announced two of the evening's features. Robert Lincoln O'Brien, former Editor of the Boston *Herald*, will speak on "How 1930 Looks to Us," and Claire E. Turner, Professor of Biology and Public Health at the Institute, will present some of the films developed by Technology's Biocinema Laboratory. These films, made conjunctively with the Eastman Kodak Company, are being made in increasing quantities for use in teaching Public Health in the secondary schools. They are profoundly interesting as exemplifying the advances in cinematographic work as well as in teaching methods. Professor Turner will supplement the showing of these films with a short description of the part the Institute is playing in bettering the health of the Nation's children.

A complete program is now in preparation and notices will shortly be in the mails. Seating, as heretofore, will be by classes and tickets are priced \$3.50.

Reunion

PLANS for the Five-Year Reunion which comes on June 6 and 7 were tentatively announced at the Alumni Council meeting (*vide infra*) last month. The Executive Committee had secured for Chairman of the Reunion Committee Thomas C. Desmond, '09, of New York, long active in Technology affairs and author of the article on South America on page 133.

Mr. Desmond announced that the preliminary plans provide for registration on June 6, with a reception at the President's house on that afternoon. On Saturday there will be an outing at some place yet to be selected, and in the evening there will be the Reunion Dinner. In 1920 the great Jamboree dinner drew 2200 Technology men and set a record for such an event in Boston. The Institute

authorities also plan to open all laboratories on Friday, June 6 for the inspection of the Alumni and to present for them evidences of the scientific work that is being carried on.

The Reunion in June will be the sixth of the All-Technology Five-Year Reunions, the first having been held in 1904. The Reunion of 1909 was part of the program which marked the inauguration of Dr. Richard C. Maclaurin as President. The third Reunion was planned for 1914, but

the World War caused plans to be abandoned. The next came in 1916 when Technology's Golden Jubilee was celebrated with the opening of the new buildings in Cambridge. The event was marked by a great pageant and formal leave-taking of the old buildings on Boylston Street. It was during this Reunion also that the unprecedented telephone dinner was held. The big dinner here in Boston was carried on a telephonic network to thirty-four cities. Both the 1920 and 1925 Reunions carried on the traditions of these earlier gatherings.

The Vice-Chairman of the Reunion Committee is Dr. Samuel C. Prescott, '94, and the Treasurer, George L. Gilmore, '90. The Executive Committee in addition to Messrs. Desmond, Prescott, and Gilmore is as follows: Everett Morss, '85, Frank L. Locke, '86, Harry J. Carlson, '92, Charles E. Locke, '96,

Edward B. Rowe, '06, Bradley Dewey, '09, Harold B. Richmond, '14, Harold E. Lobdell, '17, James R. Killian, Jr., '26, Horace S. Ford, Laurence P. Geer, '15.

Secretary Pro-Tempore

WHEN last month the then Secretary of the Alumni Association, John O. Holden, '24, found it necessary to resign because of his outside business, it was fortunate that a successor was immediately available. Laurence P. Geer, '15, long active in public health work was at the Institute doing professional work with Dr. Samuel C. Prescott, '94, of such a nature that it enabled him to assume the secretaryship of the Alumni Association until July next.

Mr. Geer from graduation until 1917 was health officer in Berlin, N. H. After leaving Berlin he has been affiliated with public health laboratories, and other organiza-



THOMAS C. DESMOND, '09, CHAIRMAN OF THE
1930 REUNION COMMITTEE

Ira L. Hill

tions in the south. During the spring he will be able to spend virtually full time upon the Association's work which includes, of course, the preparation for the Reunion in June.

142nd Council Meeting

MEETING as usual in Walker Memorial, the Alumni Council on November 25 discussed Mr. Desmond's plans for the All-Technology Reunion as described above, heard the customary reports and received with great enthusiasm an ably prepared address by William R. Greeley, '02, on Civic Engineering. It also heard the report of the Executive Committee which had accepted the resignation of Mr. Holden as recorded above, and elected in his place Mr. Geer.

Mr. Desmond's gusto was infectious and the Council obviously felt that the forthcoming Reunion would contribute much to Alumni solidarity. The Council mind also approved Mr. Desmond's desire to make the Reunion as dignified and as typical of the Institute as possible.

Turning from the Reunion to the forthcoming Annual Dinner of the Association on January 18, the Council emphatically, in fact, unanimously, voted down a motion that it be omitted this year. President Stratton commented briefly on the advantages of having a great Reunion and the contribution he hoped the Institute could make in the way of presenting an Open House (Alumni Day) for Alumni only. He also spoke of his recent trip to Cleveland, Ohio, where he spoke before the Chamber of Commerce and was given a rousing welcome by local Technology Alumni. The business of the evening was concluded with the election of James Donovan, '28, as a member of the Advisory Council on Tech Show to fill the unexpired term of Eric F. Hodgins, '22, resigned.

Dr. Prescott, who was presiding in the absence of Vice-President Harold B. Richmond, '14, then introduced Mr. Greeley. It is hoped in a forthcoming issue of *The Review* that Mr. Greeley will make a formal presentation of his plea for more city planning and more intelligent city planning.

Forty-nine members and guests were present.

Technology Songs

THE third edition of the Institute Song Book has been received appreciatively as it deserves to be. It is the first new edition since the second which was published in 1907, the first having appeared in June, 1903, under the editorship of Frederic Field Bullard, '87, composer of the music for "A Stein Song."

This new edition, published by a sub-committee of the undergraduate's Institute Committee, contains all the favorites among Technology songs — notably, "A Stein Song," "Take Me Back to Tech," "The Cardinal and the Gray," the winning songs of the Prize Song Contests of 1922, 1923, 1925, 1927, and 1929, and fourteen other selections carefully chosen from earlier editions of the book.

All but seven of the selections are harmonized for men's voices. Six of the seven not harmonized are selections originally composed or arranged by Mr. Bullard which are preserved in unison because of their effectiveness when sung that way and as a lasting tribute to Mr. Bullard.

In format it is a distinctive piece of book making.

Technology and Public Health

FOR many years at the annual meeting of the American Public Health Association it has been a custom for all of those members who are Institute Alumni to meet for a Technology Breakfast. The procedure was duly carried out at the Minneapolis meeting of the Association. Remarkably enough, twenty-eight Technology men under the leadership of Howard W. Green, '16, of Cleveland and Joel I. Connolly, '16, of Chicago, and Professor Samuel C. Prescott, '94, of the Institute evinced their loyalty and professional spirit.

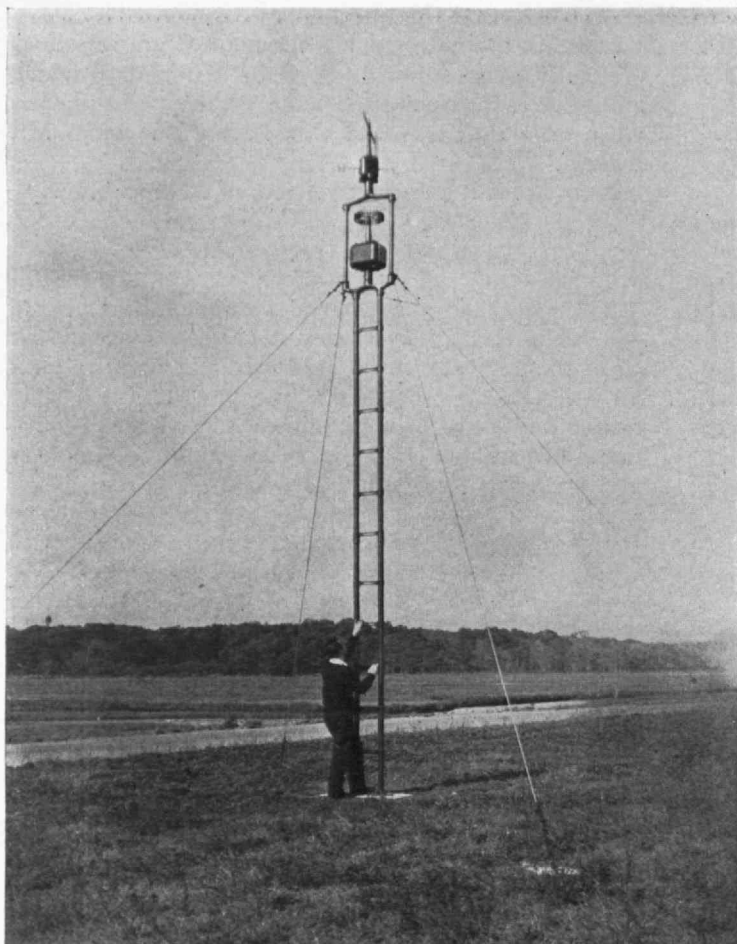
Those present included: George W. Fuller, '90; Homer N. Calver, '14; Professor Charles E. A. Winslow, '98; Howard W. Green, '16; Joel I. Connolly, '16; Carl E. Buck, '15; Dr. Valcoulon L. Ellicott, '16; Dr. Gaius E. Harmon, '13; Carl T. Pomeroy, '10; Lester VanD. Chandler, '19; Aime Cousineau, '16; Dr. John F. Norton, '06; Dr. George T. Palmer, '09; Dr. Harold H. Mitchell, '16; Elmer W. Campbell, '21; John H. O'Neill, '10; Dr. William T. Fales, '17; Dr. William F. Wild, '20; Frank J. Osborne, '12; Cecil K. Blanchard, '10; Ralph E. Tarbett, '05; Harry F. Ferguson, '12; Horatio N. Parker, '94; Ellis S. Tisdale, '15; Dr. James Wallace, '22; Dr. Philip K. Bates, '24; Robert B. Watson, '27; Bernard S. Coleman, '19.

N. Y. Club Dinner

COLORED motion pictures and the excellent offerings of the Hotel Roosevelt cuisine marked the annual dinner of the Technology Club of New York held on the evening of December 2.

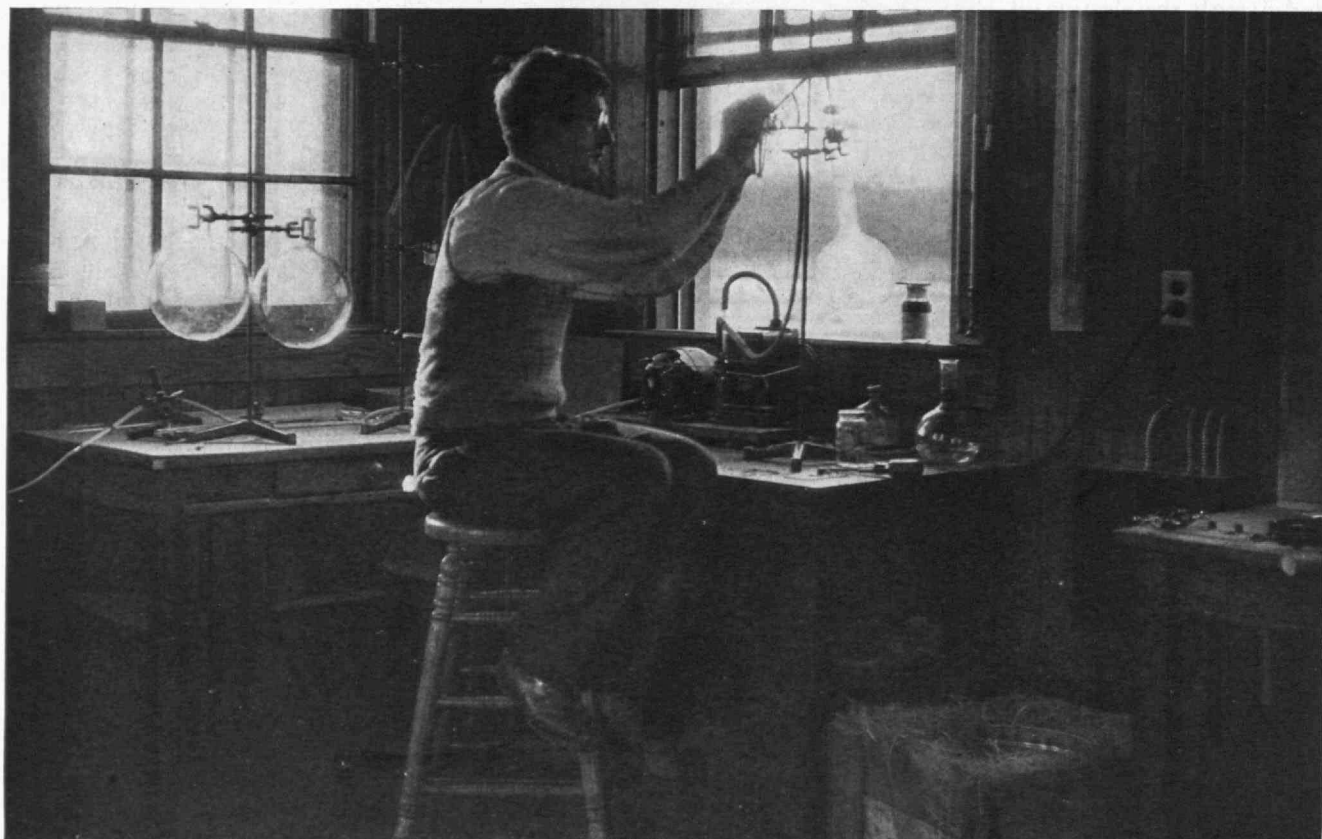
With an attendance of almost 400, the festivities went smoothly from *Crouste-Au-Pot Palvet* to silver bromide crystals, the former being set off by a soup dish background and the latter appearing on the screen in still and moving pictures. Dr. C. E. K. Mees, Vice-President and Director of Research of the Eastman Kodak Company, explained the part that silver bromide plays in the manufacture of moving picture films. He traced the course of this ingredient from its humble origin in the mustard of those vegetables which cows delight to munch. It was demonstrated by Dr. Mees that if it were not for this bovine predilection for mustard all of our moving picture actors would be forced to go to work.

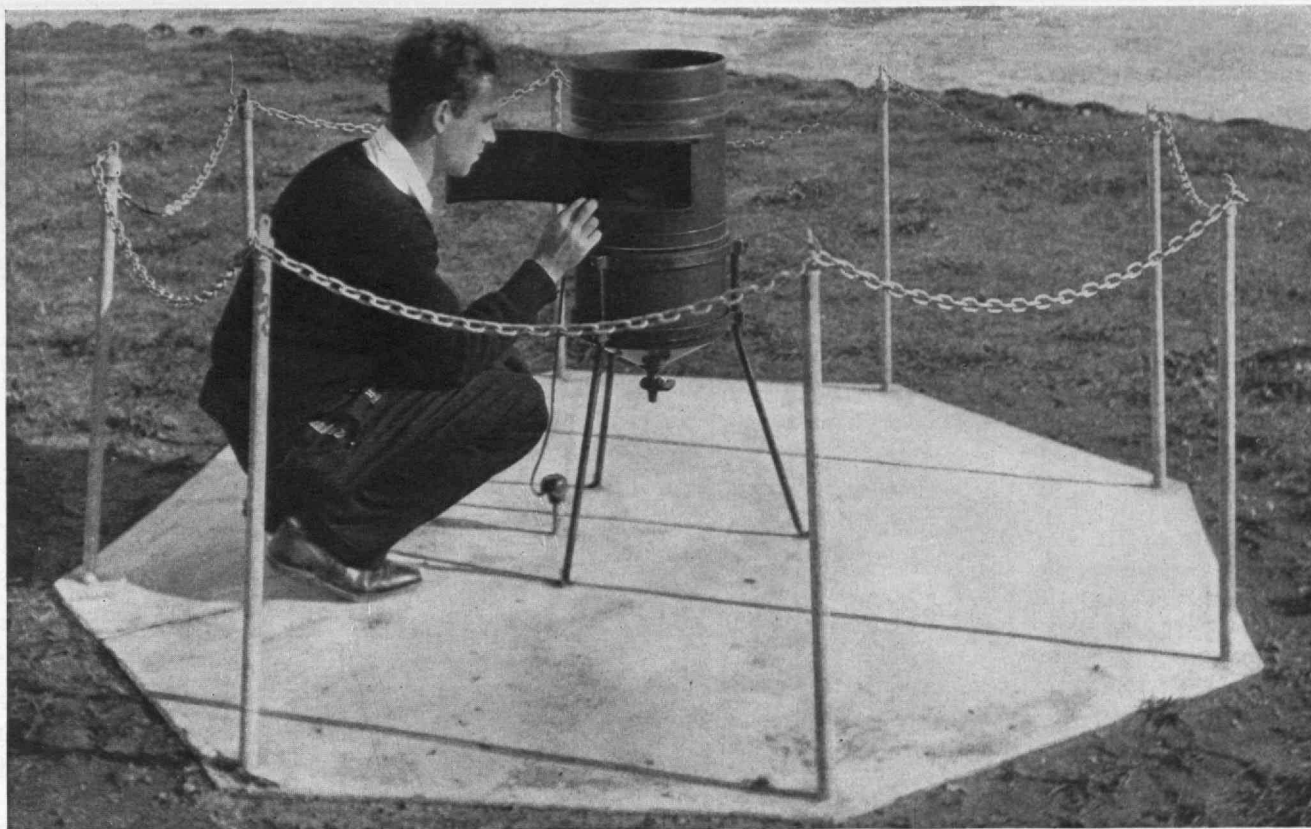
President Stratton spoke briefly as did Richard H. Ranger, '11, President of the Technology Club of New York. Orville B. Denison, '11, conducted the singing of Technology songs. It was reported that the colored pictures of nature were so realistic that Kaludy Spalding, '89 put out his pipe for fear of starting a forest fire.



FIGHTING FOG

TECHNOLOGY NOW HAS IN OPERATION AT ROUND HILL, THE ESTATE OF COLONEL E. H. R. GREEN AT SOUTH DARTMOUTH, MASS., A MODEL METEOROLOGICAL STATION, WHICH IT IS HOPED MAY ENCOURAGE THE DEVELOPMENT OF MICRO-METEOROLOGICAL STUDIES IN THE RICH FIELD OF RESEARCH OFFERED BY NEW ENGLAND'S WIDE VARIETY OF WEATHER. THE WORK OF THE NEW STATION IS LINKED WITH THE RESEARCH, STARTED SEVERAL YEARS AGO, TO STUDY THE POSSIBILITIES OF SHORT-WAVE WIRELESS COMMUNICATION, AND TO DEVELOP MEANS OF COMMUNICATION BETWEEN AIRCRAFT AND THE GROUND, AND BETWEEN AIRCRAFT IN FLIGHT. AT THE LEFT IS AN ANEMOMETER OF ADVANCED DESIGN, GIVING INSTANTANEOUS READINGS OF WIND DIRECTION AND VELOCITY. BELOW IS A CORNER OF THE METEOROLOGICAL LABORATORY WHERE STUDIES OF THE PHYSICAL AND CHEMICAL CHARACTERISTICS OF FOG ARE BEING MADE WITH THE OBJECT OF FORECASTING THIS GREAT HAZARD OF NAVIGATION





SPYING ON THE WEATHER

THE METEOROLOGICAL OBSERVATORY AT ROUND HILL IS SUPPLEMENTING THE WORK BEING CARRIED FORWARD AT THE INSTITUTE IN CAMBRIDGE UNDER THE DIRECTION OF PROFESSOR CARL G. ROSSBY. WEATHER MAPS AND FORECASTS FOR THE VICINITY OF ROUND HILL ARE NOW ISSUED TWICE DAILY FOR THE BENEFIT OF AIRCRAFT OPERATING FROM COLONEL GREEN'S ROUND HILL AIRPORT. THE LABORATORY AT CAMBRIDGE ALSO ISSUES A VERY COMPLETE DAILY WEATHER FORECAST WHICH IS POSTED THROUGHOUT THE INSTITUTE BUILDINGS. THE PHOTOGRAPH ABOVE SHOWS THE RAIN GAUGE AT ROUND HILL STATION. IT OPERATES ELECTRICALLY, MEASURING PRECIPITATION IN HUNDREDTHS OF INCHES, AND REGISTERING GRAPHICALLY IN THE STATION'S OBSERVATORY. TO THE RIGHT IS APPARATUS BY WHICH THE HEIGHT OF CLOUDS IS DETERMINED TO GIVE AVIATORS ACCURATE KNOWLEDGE OF THE FLYING "CEILING." AT NIGHT A FIXED GROUND SPOTLIGHT THROWS A POINT OF LIGHT ON THE NEAREST CLOUD FORMATION AND BY SIGHTING ON THIS SPOT THE HEIGHT OF THE CLOUD MASS IS ACCURATELY SHOWN





Honors

TO CASS GILBERT, '80, architect of the Woolworth Building and many other well-known buildings, citation in recognition of his public service at a dinner given by the Chamber of Commerce of the State of New York. In a presentation address made by the President of the Chamber, he was described as one "who has, by his genius, helped to make New York's skyline one of the wonders of our time."

TO DR. GILBERT N. LEWIS, of the University of California, and from 1905 to 1912 Professor of Chemistry at the Institute, the Davy Medal of the Royal Society for his work on thermodynamics and the theory of valence.

TO BARON TAKUMA DAN, '78, honorary life membership in the American Institute of Mining and Metallurgical Engineers at a meeting held in Tokio in November. Presentation was made by Professor Emeritus ROBERT H. RICHARDS, '68, under whom Baron Dan studied.

TO GARY N. CALKINS, '90, Professor of Protozoölogy at Columbia University, and to WILLIAM Z. RIPLEY, '90, Professor of Political Economy at Harvard University, honorary degrees from Columbia University.

Broken

By EDWARD E. ALDRIN, '17, the record for crossing the Continent by air. In a Lockheed Vega airplane he journeyed from coast to coast in 15 hours, 45 minutes, elapsed time, or at an average speed of 158.7 miles per hour. The fastest non-stop time record is still held by Frank Hawks at 17 hours, 38 minutes.

Appointments

FREDERICK G. CLAPP, '01, consulting geologist and petroleum engineer of New York and Paris, to be a delegate of the United States Government, the National Research Council, and the National Academy of Sciences to the Second International Drilling Congress which was held in Paris, Nancy, Strasbourg, and Pechelbronn in September.

DR. JAMES A. TOBEY, '15, Director of Health Service of The Borden Company of New York and co-author of a recent book on milk, "The Most Nearly Perfect Food," to be a member of the Committee on Milk of President Hoover's White House Conference on Child Health and Protection.

WILLIAM J. SAYWARD, '91, to be Vice-President of the American Institute of Architects for a second time.

WILLIAM R. GREELEY, '02, member of the firm of Kilham, (Walter H., '89,) Hopkins, and Greeley, to be President of the New England Regional Planning Board.

LEROY W. CHANDLER, '12, formerly with the Yale and Towne Manufacturing Company in Stamford, Conn., to be assistant to the President of the Graton and Knight Company in Worcester.

EDGAR L. KAULA, '16, to be manager of the New Zealand branch of the Texas Company (Australia), Ltd., with whom he was formerly sales manager.

WILLIAM WYER, '18, to be Secretary and Treasurer of the Missouri Pacific Railroad Company.

HUGH S. FERGUSON, '23, to be general manager of the Dewey and Almy Chemical Company in Cambridge.

GEORGE W. SIMONS, JR., '15, to be city planner of Jacksonville, Fla. He has been engaged for the past year in establishing a constructive scheme of city planning.

Elected

LAWRENCE P. GEER, '15, to be full-time Secretary of the Alumni Association (see page 153), replacing JOHN O. HOLDEN, '24, who resigned as part-time Secretary in November.

DR. FREDERICK G. KEYES, Head of the Department of Chemistry, to be honorary member of the American Society of Refrigerating Engineers.

Deaths

Since the last issue, reports have come to The Review of the decease of the following:

JAMES L. ARNOTT, '74, on October 15. He was a consulting hydraulic and mill engineer in Manchester, N. H.

FREDERICK E. HILL, '82, on April 10. After practising architecture for a number of years, he worked as an auditor for the United States Housing Corporation in Washington, returning later to architecture.

HERBERT F. PIERCE, '88, on October 27. His profession of civil engineering caused him to be affiliated with many engineering firms in Boston and Newton, Mass., during his lifetime.

EDWARD T. NEWTON, '90, on September 26. He had been connected with paper manufacturing in Holyoke until ill health forced him to retire and spend his winters in Florida.

GEORGE S. SELFRIDGE, '90, on November 4. Besides studying at Technology, he attended Annapolis Naval Academy and Harvard Law School. He practised law in the firm of Coolidge and Hight.

HENRY L. NEWHOUSE, '94. No date was given for his death. He was a distinguished architect in Chicago.

CHARLES A. HARDY, '04, on November 30. He was a member of Course III and lived in Chatham, Mass.

DR. GEORGE F. WHITE, '06, on September 18 from a fall. He was Professor of Chemical Engineering at Clarkson College of Technology until he became chemical engineer and director of the science department of Bauer and Black in Chicago.

JESSE FLETCHER, JR., '16, on August 11, as the result of an operation. He was manager of the Hotel Severin in Indianapolis and President of the Indianapolis Tent and Awning Company at the time of his death.

SAMUEL FINN, '29, on July 28. He was drowned while swimming in the Chesapeake Bay.

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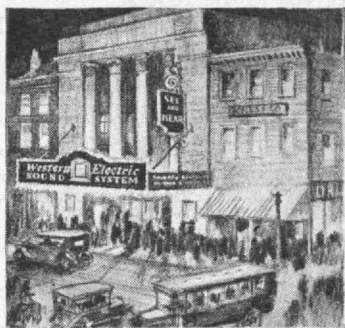
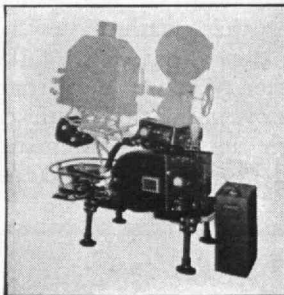
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MATHEMATICS AND ART

(Continued from page 132)



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Heaviside with his operational calculus. Although Heaviside flourished after the crest of the romantic movement had already passed, the whole personality, the outbursts of combative emotion in his books, the continual struggle with the traditions, are in accordance with romanticism. He is himself a hero of a romantic poem — Prometheus Bound as he might have been conceived in the 1830's.

The romantic period in mathematics, while it cannot be given any definite chronological bounds, carries us well towards the later years of the Nineteenth Century. The period of self-satisfaction in mathematics and in physics which ensued thereon, the period in which the physicist's ideal was the addition of another decimal place to already established constants in which many a mathematician envisages the future as an absolutely traditional pursuit of lines of research already mapped out, is but the mirror of the Philistinism which has architecturally so disfigured Europe and America, the era of the red plush sofa. The present epoch both in the mathematical disciplines and in the arts represents a revolt against this Philistinism. The spirit underlying both revolts may be regarded as a development of romanticism. The romantic artist struck out on a line of his own in revolt against the rigidity of the Eighteenth Century. The artist of the present also regards it as his privilege to experiment and to adopt totally new methods; but, and this is important, without the act of assent that marks the true romanticist. The romanticist said, "I believe in this new art, as against the vitiated tradition." The modernist says, "This idea looks interesting to me. Let me see where it leads me, even though I may give it no ultimate approval." This is the genesis of futurism in painting, of cubism and such bizzareries, and of such modern literary movements as expressionism. The mathematical counterpart of all these is the interest in postulational systems irrespective of the assigning of any ultimate validity of the initial postulates. The whole general analysis movement of the Chicago school; the work of Peano and of Huntington; the modern reformed logic of Brouwer, who rejects the law of the excluded middle; all these lie in this direction. It is not an accident that the period of the bizarre physical theories of Einstein is the period of bizarre music, of bizarre architecture, of bizarre literature, and of a bizarre stage.

Whatever Einstein's personal tastes may be, Havelock Ellis is wrong in rating him as a classicist. An Eighteenth Century classicist such as Euler would have suppressed on its inception any such idea as that of Einstein's gravitational relativity. For your true classicist there is but one straight line of mathematical progress and anything off that line is worthless. On the other hand, Einstein is permeated with the modern idea, the idea of Bertrand Russell, that mathematics is the science "where we never know what we are talking about and do not care whether what we say is true," the science of free logical experimentation with conceptions of order, applied to an indifferent material. Einstein developed his full gravitational (Concluded on page 162)

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MATHEMATICS AND ART

(Concluded from page 160)

theory in the beginning as a *tour de force*, as a possibility, interesting, whether true or false. That it was ultimately to be verified reflects enormous credit on his intuition, but even unverified, it already existed as a mathematical essence, and this essence, this construction, parallels closely the goal of the effort of the modern artist.

This double aspect of Einstein's work, and indeed of all physics, may serve as a final link between mathematics and the arts. As is well-known, most of the arts possess both a presentative and a representative aspect. A painting has beauty not merely as a study in abstract design but as a representation of the outer world. No poem is so purely an intellectual work that it is wholly without a pictorial aspect. Thus mathematics, too, besides the beauty of inner structure, has a further beauty as a representation of reality. This is most clear in mathematical physics but even in the purest of pure mathematics, mathematical physics often serves as a valid if unconscious guide. Many a pure mathematical study is an impression of some chord of the physical world.

To sum up, mathematics has the goal of a fine art and elicits the emotions elicited by a fine art. Its limitations are akin in nature if not in degree to those of the fine arts. It participates in the inner life of the fine arts, and like the fine arts, has both presentative and representative aspects. Call it a fine art or not as you will, its true nature is as close to that of music, of literature, of painting, as these are one to another.

SOUTH AMERICA IN 1929

(Continued from page 135)

Several kind Technology mining engineer friends had arranged in advance for visits by us to Chuquicamata, El Teniente, Maria Eleana, and other copper and nitrate mines in South America. Most of the mines are located in out of the way places, difficult of access, but every visitor probably finds, as we did, that the effort necessary to visit such mines is richly repaid.

The two beautiful Chilean cities, Valparaiso, on the Pacific, and Santiago, in its fertile valley with the towering Andes in the background, will never be forgotten by any visitor; nor will be that soul-exalting, day-long mountain railroad journey, from Santiago up and over the high, often snow-filled passes of the Andes, to Mendoza. Mt. Aconcagua, higher than any other peak in North or South America, is visible from the train, and one obtains superb views also of several other only slightly less high Andean summits. We observed much of interest, also, while crossing, on the following day, the level plains of "pampas" of Argentina, from Mendoza to Buenos Aires. Wild Argentinean ostriches and red flamingoes were occasionally seen from the train, as well as great herds of cattle and horses.

From Buenos Aires we took the night boat across the La Plata River to stay for a while (Continued on page 164)

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NORTH STATION

SOUTH AMERICA IN 1929

(Continued from page 162)

in Montevideo, the handsome capital of Uruguay. Uruguay is perhaps the most solidly prosperous of all the South American countries.

Nearly all South American travelers visit also, as we did, Sao Paulo, the coffee capital of Brazil. Almost half of the coffee supply for the world passes through Sao Paulo. Sao Paulo is famous as well for its large snake farm, freely open to the inspection of visitors, where many kinds of poisonous snakes are kept in open enclosures for ultimate use in making snake antitoxin. Thousands of people die every year in Brazil from snake bites, but there have been fewer fatalities since the development of this snake antitoxin institution. Even after having been drinking only Sao Paulo water, I still kept on dreaming about our visit to the snake farm for several nights thereafter. I pass on this warning to other visitors for whatever it may be worth.

Anyone who can arrange to do so should visit one of the great Brazilian coffee plantations. We shall always remember the courteous hospitality shown to us, as it would also be shown to other strangers, by the cultured Brazilian owner of one of the largest coffee plantations near Sao Paulo.

Our last city visited on the mainland of South America was Rio de Janeiro, that gay Brazilian city with the most beautiful harbor in the world. Naples and its bay are beautiful and so are Constantinople and the Bos-

porous, but they are surpassed by Rio de Janeiro. My wife was vexed, at first, when I wakened her to go on deck at sunrise as our ship entered the harbor of Rio de Janeiro, but she had to admit afterward that it was worth it.

Perhaps the readers of The Review may be interested in a brief account of the visit we made while in Chile to one of the largest copper mines in the world, El Teniente. This mine, owned by the Braden Copper Company, is located in the mountains of central Chile, not far from the Pacific Coast. An able Columbia School of Mines graduate (the general manager of this mine) and his wife, were our hosts and guides for the trip from Santiago to the mine and back. Never have we spent two days in better company or amid more interesting surroundings. Leaving the mainline railroad from Santiago at Rancagua, we rode on for about forty-five miles more in an "autocarrill" (automobile engine and body mounted on a railroad truck) over a private narrow gauge railroad built especially by the Braden Copper Company to serve the mine. This railroad in itself represents a noteworthy feat of construction engineering. From Rancagua to Sewell, the terminus for the El Teniente mine, the railroad climbs more than a mile high, curving constantly through difficult country, much of the way along the cliffs of a rugged mountain canyon. About 8,000 people live in the El Teniente mining community, mostly native Chileans, but with a well-housed colony of perhaps a hundred engineers from the United States, some of them with wives and children. Life *(Concluded on page 166)*

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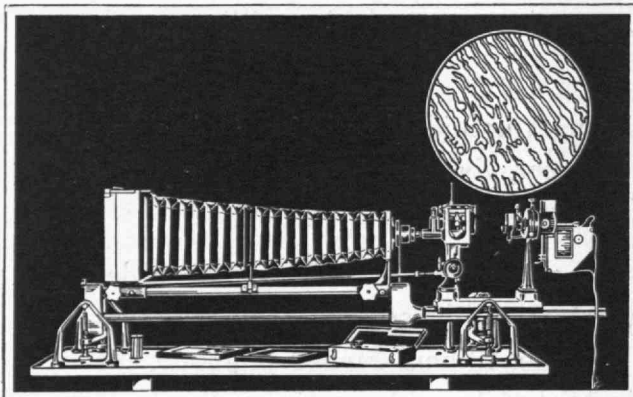
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SOUTH AMERICA IN 1929

(Concluded from page 164)

in a self-contained community like this, way up in desert mountains, may have some drawbacks but it also has compensations.

Just as at Chuquicamata, Maria Eleana, and other important South American mines we visited, the management of El Teniente is almost exclusively in the hands of mining engineers from the United States. Such mining engineers are helping to develop among South Americans a new and increased respect for the United States and its methods. The great scale of these mining enterprises, and the efficient results produced, challenge the admiration of all. One is prouder yet of the engineering standards of the United States when one has had the chance to see what some of our engineer fellow countrymen are doing in South America.

My wife and I were traveling only for pleasure and study, and with no commercial objects at all in view. We observed enough, however, to be certain that, under proper conditions, South America is both willing and able to do a great deal of business with the United States. Americans engaged in industries which could trade with South America might well learn a little Spanish and take a trip south. They will be sure to enjoy the trip (as will their wives if they go along) and, if they really are in a position to render business service to South American customers, the customers are there to be found.

We were in South America within a few months after the tour of President Hoover and his party. It was evident to us throughout our tour that his visit had been extremely helpful in promoting better feeling on the part of South Americans toward the United States. The most cordial friends of the United States in South America are undoubtedly the people of Brazil. The people of Argentina, Uruguay, and Chile are perhaps less warm in their friendship for us but in all of these countries also the compliment of President Hoover's visit was greatly appreciated.

Before the World War, South America had her face turned toward Europe rather than the United States. But the commerce of the United States with South America has enormously increased since the World War, with resultant good to the United States and South America both. South America, near at hand, is perhaps potentially the best foreign customer of the United States. Surplus North American capital can find ready and profitable employment in South America and North American manufactured goods are finding, more and more each year, a good market in South America.

The almost uniformly enthusiastic receptions accorded throughout South America, to President Hoover and his party were indications of growing friendship in South America for the United States. Our able engineers and other business representatives down there have also been serving for many years, and most valuably, as informal ambassadors of good will. An optimistic observer may well trust that the time is at hand for the hopes and dreams of closer bonds of political friendship and linked financial and trade interests among the South and North American republics.



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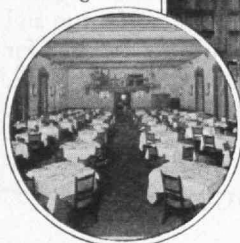
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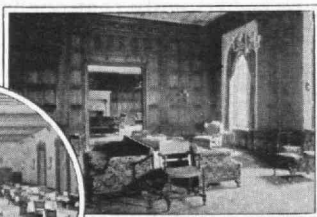


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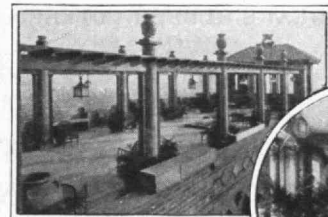


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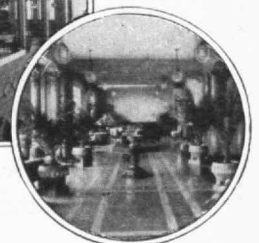


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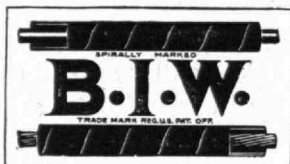
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MASTERING RIVERS IN THE LABORATORY

(Continued from page 138)

researches taken into the laboratory in recent years had been the means of making a saving in cost of the full-size structure greater than the cost complete of the model and the laboratory which contained it. The laboratory of the Technical University at Stockholm, Sweden, reports economies of a similar character.

IN 1913, while visiting the great building exposition at Leipzig, Germany, the author's attention was called to models of some of Professor Engel's laboratory apparatus, which led him to visit Professor Engel's two laboratories, the old and the new. In 1924, he again visited Professor Engel's laboratory and several others, subsequent to attendance at the World Power Conference in London, and was amazed at the remarkable progress within 11 years, notwithstanding the impediments of the World War. This progress led him to make further investigation, which resulted in his pleading with the secretary of the German National Engineering Society and several of the leading professors of hydraulics in Germany, urging them to prepare a book which should contain descriptions of these laboratories and of their most noteworthy researches.

These gentlemen complied, and in 1926 the Association of German Engineers published a large and beautifully illustrated volume entitled "Wasserbaulaboratorien Europas," which in addition to the most noteworthy laboratories in Germany, with great breadth of view, included descriptions of noteworthy hydraulic laboratories in Austria, Sweden and Russia, and the researches made therein. This admirable recent work of these European scientists so impressed the writer that he arranged to have it translated into English, and in connection therewith he again in 1927 made a tour to the most remarkable of these European laboratories, including several in Italy and Switzerland.

The writer's first work in a hydraulic laboratory was more than fifty years ago, in connection with helping one of the most eminent of American hydraulic engineers to develop instruments for the measurement of flowing water and in determining the laws governing loss of head in conduits for water power development. For fifty years the author has been actively engaged in practice as a hydraulic engineer, mainly with large problems of water power development and the design of municipal water supplies for domestic purposes and for protection against conflagration.

In 1928, sharing the feeling of Bacon, the English philosopher, that, "every man is debtor to his profession," he came to feel strongly that one who had found great pleasure and the durable satisfactions of life in fifty years of practice should strive to *put something back* in partial payment of his own debt to the profession and to those who had gone before. Therefore he arranged for the publication of a translation of this German book, with extensions, comprising in all nearly 900 pages, which brought its researches up to date, containing accounts of the equipment and of the work in about forty of the most noteworthy laboratories (Continued on page 170)

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MASTERING RIVERS IN THE LABORATORY

(Continued from page 168)

in Europe and America under the title "Hydraulic Laboratory Practice." The care and labor connected with the publication of this book was kindly undertaken by the American Society of Mechanical Engineers as a contribution in promotion of engineering science and art. The writer of the present article refers all persons interested in the study of hydraulic problems by means of models to this book published by the American Society of Mechanical Engineers, as the most convenient means of learning of the vast scope of the investigations carried on in these hydraulic laboratories during the past ten years, their vast practical importance, and the warrants which they give for expecting great future progress.

It is of interest as showing present activities that although the author had collected all data available up to about one year ago, regarding the most noteworthy hydraulic research laboratories for inclusion in the book described above (exclusive of the small laboratories, used mainly for purposes of undergraduate instruction at engineering colleges), information of further progress has since been coming in at such a rate and so many new laboratories have been built that it has become necessary to publish an appendix, which is now in preparation.

THERE are still many researches of great importance to many branches of engineering awaiting proper laboratory facilities, among which are the following:

1. *Researches for promoting greater precision of measurement of flowing water.* (a) *By means of weirs of various forms.* (b) *By current meters of improved design.* (c) *By a "Standard Weir."*

(a) It is from the storage of flood discharge that most of our large hydroelectric power plants receive their motive power, and the historic records of measurement of flood discharge often are extremely crude. The best measurements of flood discharge of rivers are those made over spillways of dams. These dams present crests in great variety of form of whose precise coefficients of discharge we have no certain knowledge. It is desirable to have these coefficients of discharge accurately determined by means of models.

(b) The standard sharp-crested weir often has to be used under other than ideal conditions of approaching current. Turbulence in the approach to any sharp-crest weir affects the extent of contraction of flow beneath the jet, and causes inaccuracy in estimates of discharge made by the use of coefficients determined under ideal conditions. It is desirable to experiment with such weirs having various kinds of turbulence in the approaching current and to measure precisely its effect in lowering the value of the coefficient of discharge.

(c) It is highly probable that a new form of "Standard Weir" could be developed of greater accuracy under average conditions of use, than the present standard sharp-crested weir. To reduce the error in measurement this new standard weir ought to have a sloping approach and a rounded crest upon which the turbulence or slant of approaching current would have far less effect in changing the coefficient *(Continued on page 172)*

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MASTERING RIVERS IN THE LABORATORY

(Continued from page 170)

than it does with the sharp-crested weir. It is desirable to once for all find the best form, and to learn of the extent to which its coefficient may be modified.

II. *Precision of measurement by revolving fan-like current meters.*

(a) The precision of measurement by revolving fan-like current meters is adversely affected by turbulence of the current. It has long been obvious that some types are more accurate than others under these conditions. It is desirable to develop a new type, on which these adverse conditions shall produce the least possible impairment of accuracy, and which at the same time will possess the smallest liability to obstruction or error by catching upon its revolving propeller, weeds, grass or other matter suspended in the current. Also it is desirable to learn the percentage of error that may result from the measurement of mean velocity in the cross-section of a channel presenting turbulent or twisting eddying currents, by means of meters of ordinary types now in use.

III. *The Siphon Spillway, as a means of discharging surplus water from reservoirs or canals with exceedingly small excess of flood height above the ordinary working level.*

This is a device used occasionally during the past forty years in Europe and America. The author believes this device has never yet been put to use to the extent that its merit warrants. He believes that siphon spillway units can be constructed, each with a throat ten to fifteen feet wide by from ten feet to perhaps fifteen feet in height, each one of which under favorable conditions will discharge from 3000 to perhaps 5000 cubic feet per second, and that ten or twenty such units built of portland cement concrete, can be placed side by side, and discharge a flood of say 25,000 to 100,000 cubic feet per second while permitting the reservoir flood level to rise not more than one foot above the ordinary working level; thereby permitting a less high and costly dam, and obviating the need of using broad expensive areas of land for flood flowage. Meanwhile such a spillway will permit the power plant to function at any time with reservoir head up to within a foot of the flood level. A preliminary study with scale models in a series of say 1/24, 1/12 and 1/6 full-size, with a glass side wall permitting study of eddies, would lead to finding the shape giving the least eddy loss and least friction loss, and greatest coefficient of discharge; after which experiment should be made on a thin section perhaps only one foot in horizontal width on full-size vertical scale, to make sure that the maximum suction effect of atmospheric pressure in lifting the discharge to a height of ten feet or more above the crest, has been correctly worked out.

The siphon spillway presents one of the cases in which the small-scale model may not alone tell the whole story, because the atmospheric pressure acting on the model cannot be conveniently varied. Moreover, it is difficult to predict from the model just how high the water can be lifted above the reservoir level by the dragging out of the air from the top of the siphon chamber.

(Concluded on page 173)

MASTERING RIVERS IN THE LABORATORY

(Concluded from page 172)

The results of these problems, having been once solved by any one of the full series of laboratory experiments above described, could serve for all time.

IV. *The hydraulic laboratory idea applied to river regulation.*

In the opinion of the author the hydraulic laboratory idea can render its greatest service to mankind in helping to work out and define the natural laws which control erosion of river beds and the deposit of sediments; and in helping to develop the most economical means for confining a straightened river to its prescribed new course, under the widely varying discharges from drought to flood, and over various kinds of gravel, sand, silt and other river bed material. To accomplish this the laboratory would need supervision by a veritable genius, an unprejudiced and persistent seeker after truth, quick to take a hint from minor things seen in the course of experimenting. He must alternate his studies first in the laboratory, then in the actual river, then back again, over and over again, and be patient in a task that might require ten years before he could safely generalize his observations into law.

The author is confident that many of our greatest rivers could be straightened and made to travel in the straight and narrow way and carry their burden of silt to the sea, through a channel tolerably free from obstruction to navigation by "cross over-bars" and with smaller flood rise.

Many of these problems could best be carried out in a

great national laboratory, supported by the government with a fund of say \$50,000 per year for staff, operation and maintenance. Germany has three great hydraulic laboratories supported by the general government devoted chiefly to researches upon problems of public works, apart from about half a dozen other hydraulic laboratories at its engineering colleges also under government support and control, and which divide their work between instruction of students and research on great out-of-doors problems of public works.

Ten years ago in China, at a gathering of high public officials, I recommended such a laboratory for problems of flood relief, and publicly stated my belief that *in proper hands* it would be made to return to that country dividends in results annually equivalent to a thousand per cent on its cost. This also may be true for other countries.

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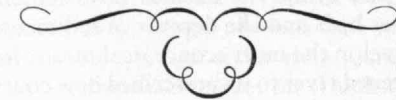
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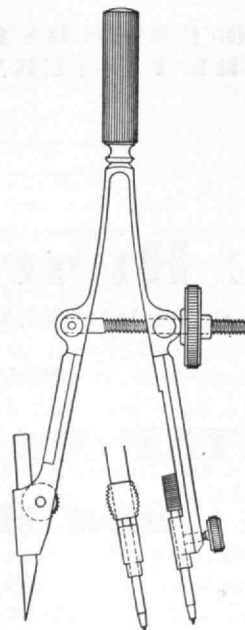
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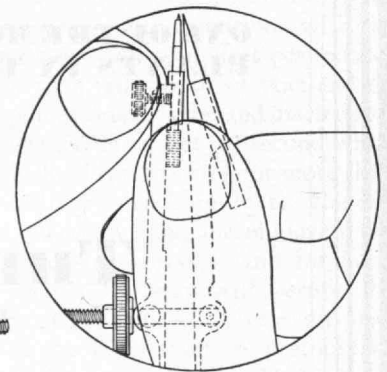
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1882

Frederick Elmer Hill, who at one time was associated with the Class as a special student in the Department of Architecture, died suddenly in Washington, D. C., on April 10, 1929. Some time after leaving the Institute he went to New York City where for a number of years he was a practising architect. In 1919 he wrote that he had temporarily given up his architectural work and had entered the government service as one of the auditors for the United States Housing Corporation at Washington. Later he returned to his former calling, and with an office in Washington, he had a variety of interesting work.

During the later years of his life he spent much time and study over the probable design of Solomon's Temple and had partially completed drawings showing a restoration of this building which, when finished, he felt would be interesting to Bible students. His wife and two children died some years ago. A brother and two sisters survive him. — ALFRED L. DARROW, *Secretary*, 8 Beacon Street, Boston, Mass.

1884

At the regular luncheon meeting of the Engineering Association of Hawaii at Honolulu on August 30, Professor J. Peterson Ryder, Dean of Men at the Drexel Institute, was one of the speakers. He was for a number of years director of physical training and attended some of the sessions of the Pan-American Surgical Conference in Honolulu.

Dr. Henry Daggett Hooker, son of our late classmate, for the past ten years Associate Professor of Horticulture at the University of Missouri, died from an electric shock on October 26 at the age of thirty-seven years. He leaves a wife, mother, and brother. — AUGUSTUS H. GILL, *Secretary*, Room 4-047, M. I. T., Cambridge, Mass.

1888

Herbert F. Pierce died on October 27. He was born in South Braintree, Mass., in 1866. He attended Thayer Academy and was graduated with our Class from the Institute, where he took Course I in Civil Engineering, which profession he followed later throughout his life. He was with the State Board of Health, Lawrence, Mass., during 1888 and 1889, engaged in experiments on sewerage filtration; with F. L. Fuller in Boston from 1889 to 1890 on water supply and sewerage. He was assistant engineer of sewers at Newton, Mass., from 1891 to 1899. From April, 1899, he was with Pierce and Barnes Company, civil engineers, at 7 Water Street, Boston, doing general civil engineering.

From July, 1918, to October, 1919, he was located at Bath, Maine, as resident engineer on Housing Project No. 13 of the United States Shipping Board, in charge of design and construction of street sewers, water supply, and so on. During the war he was a member of the Newton Constabulary. Pierce was a member of the Boston Society of Civil Engineers, Past Master of Rural Lodge, A. F. and A. M., of Quincy, Mass., and member of the South Shore Commandery, K. T. He had resided in Newton for thirty-two years.

Funeral services were held at his former home, 136 Eliot Avenue, West Newton. The Class was represented by Sawyer, Runkle, Stetson, Lee, Buttolph, and Snow. He is survived by his widow, Mary F. Pierce, and by his son, Henry C. '20. His health was good until a few months before he passed away, due to a heart attack. He never missed a class meeting, reunion, or an alumni gathering that it was possible for him to attend. He particularly enjoyed the Fortieth Reunion of the Class in 1928.

A. F. Mead, with Mrs. Mead and two of his daughters, spent last winter in Honolulu. He has a movie reel of the volcano in action and of other interesting views, which your Secretary will invite him to show at one of our class meetings.

Mrs. Lowell F. Hobart of Cincinnati, widow of our classmate, is the President-General of the Daughters of the American Revolution. — WILLIAM G. SNOW, *Secretary*, 38 Chauncy Street, Boston, Mass.

1890

We are pleased to announce that the notice which appeared in the November Review relative to Frederick W. Swanton was slightly previous. Fred is still on earth. As a result, however, of this misunderstanding, your Secretary has been favored with two nice letters from Fred. Possibly it would be a good way to get a rise out of some of our classmates, to make a similar announcement in regard to you. Fred's home is at 3318 Tennyson Street, Washington, D. C., where he is enjoying life with a good wife and nine-year-old daughter. Last summer they motored to Maine, coming by way of Atlantic City, through Maine and New Hampshire, taking four days going each way. Mrs. Swanton being an excellent driver, relieved Fred at times at the wheel. Fred hopes to be with us at our Fortieth Reunion next June, which you should all bear in mind, and make plans accordingly. He will probably bring his wife and daughter with him, as we hope that many of the rest of you will do. At Easter time this year, Bertram Lenfest and his wife called on Fred while on a motor trip from Brooklyn, the only '90 man he has seen for the past year.

We regret to announce the death of Edgar V. Seeler, on October 26, at his home in Philadelphia. Ed was with us two or three years while at Technology, in Course IV. After that he attended the Ecole des Beaux Arts where he won three silver medals in competitions. He then went around Europe on a sketching tour, returning to America to take the position of assistant professor of design in the School of Architecture in the University of Pennsylvania. He began to practice architecture in 1895, giving up his teaching at that time. He was a Fellow of the American Institute of Architects. He is survived by a wife and three children.

Edward T. Newton of Holyoke, Mass., passed away September 26. He was a member of one of the old paper manufacturing families. Ed had not been well for some time, and the past few years has spent his winters at Fruitland, Fla. Ed graduated from the Holyoke High School, afterwards taking a course at Cornell. He was with us for about two years. He had been Treasurer of the Wauregan Paper Company and later of the Chemical Paper Company. Following his retirement from business, he traveled extensively in this country and in Europe. He was a Past Master of the Masonic Lodge. Ed leaves his wife and two sons. He was one of the members of the Class who almost invariably showed up for the Reunion, and we shall certainly miss him.

Alfred J. Delano's address is 141 North Anita Avenue, Brentwood Heights, Los Angeles, Calif.

George S. Selfridge died November 4, at his home at 118 Marlboro Street, Boston. George was a Course VI man, having come to us from Annapolis Naval Academy. He later studied law at Harvard Law School, and was admitted to the Bar, and for a long time had been identified with the firm of Coolidge and Hight. He is survived by his wife and three brothers. George was a member of the Union Club, the University Club, the Union Boat Club, and Boston Athletic Association. He was also a member of the Society of Mayflower Descendants.

Mr. and Mrs. J. L. Batchelder are spending the winter at the Ritz-Carlton, in Boston. Your Secretary and John have not been able to get together for a single round of golf this summer, but hope to be ready to tackle any of you birds at the time of our Reunion.

In October, Mr. and Mrs. H. P. Spaulding motored to Scarsdale, N. Y., to visit their daughter, and while there called on Mr. and Mrs. Gary N. Calkins, whose home is in that town. Harry reports that Gary has put on muscle and is playing some golf and tennis. At present he is very busy preparing for the 175th Anniversary of the founding of Columbia University with which he is associated.

1890 Continued

On the return trip, Harry stopped at Waterbury, Conn., and had a little visit with Mr. and Mrs. Darragh deLancey. He reports that Darragh is the same old boy, and with the same red top over his head. Darragh has retired from business, and since then has taken up sculpturing. He has done some very wonderful work. He designed the war memorial which is at Great Barrington, and has made many other very fine pieces; and he is most happy. Last summer while on the Maine Coast, he dipped in oils (not oil stocks) and has produced some very attractive sketches. He has an attractive studio adjoining his home, as well as a studio in New York.

We note that among those given degrees by Columbia University are two of our classmates. "Gary Nathan Calkins, B.S., Ph.D., Professor of Protozoology. For thirty-five years successfully instructor, professor, and head of a great department of science, teaching, and research in our university; vigorous in exposition and urgent in action." "William Zebina Ripley, Ph.D., Professor of Political Economy in Harvard University—master of the knowledge which relates to the economic organization of industry and business, and constantly the inspiring interpreter of that knowledge."

Elton D. Walker, Head of the Department of Civil Engineering at the Pennsylvania State College, is about to take his sabbatical leave. He is planning to start about the first of February on a motor trip through the South and West to the Pacific Coast, and then home by way of the northern and central tier of states. He plans to visit a few hydroelectric plants, water filtration plants, sewerage disposal plants, irrigation projects, and also visit a few of the colleges having hydraulic laboratories for research work. His reason for writing to your Secretary is that he wishes to know when our Fortieth Anniversary Reunion is to take place, as he plans to return in time to be with us next June. So, your Secretary hopes that many more of you will put that down, as without doubt the first week in June will be the time of the big Technology Reunion. The dates are definitely set, and you will hear from your Secretary, so plan accordingly.

Our Class Reunion date has been set for Thursday, June 5, preceeding the All-Technology Reunion. Ladies will be expected to be present.—GEORGE L. GILMORE, Secretary, 57 Hancock Street, Lexington, Mass.

1893

Because of lack of space the long account of George B. Glidden's trip in South America had to be cut in half last month. The rest of the story follows: "From Valparaiso to Arica was a five day sail, making daily stops at most forlorn ports, entirely barren except for a few small trees on imported soil. Ducks, gulls, vultures, and pelicans began to appear in huge numbers off these ports. At these places they loaded copper in 125-pound blocks. At Iquique they started pronto on anchoring at seven in the

morning to load nitrate of soda in bags weighing 175 pounds. Twelve or thirteen of these bags would be lifted in a sling and put aboard.

"At Arica we disembarked and spent the night at a very fine hotel on the water front. As it was not finished and the dining room was not open, we ate at a very native house called the Vergara, where the food was as nearly poor as any found in South America. It was surprisingly good everywhere else. In the harbor, in plain view from our room, was a small island with a rocky point from which every morning ducks would fly north for over an hour and back again at night, millions of them. Seals were playing in the harbor and there were many pelicans and vultures. Arica was small but very foreign and interesting. In all South America the houses are low, flat-roofed, and built around stone-paved courtyards. They were often two stories, but seldom more, in the small towns.

"Serenaded by the military band as is the custom at the weekly train, we left by the most uncomfortable sleeper imaginable for La Paz, Bolivia. This was the beginning of the high spot of the whole journey—two weeks in the High Andes. Very steep climbs over the roughest roadbed ever, but the mountains were superb in the moonlight. By morning we were running along the wonderful plain of the Andes, the always barren, but snow-capped mountains in view gradually getting a little less barren as we neared La Paz. Llamas, sheep, hogs, donkeys, bulls, dogs, an ostrich, and Indians were along the line. Alto La Paz, on the rim of the valley, where lies La Paz, was reached at two in the afternoon and then the train started down the 1,500-foot drop to the bottom of the valley, taking nearly an hour to wind to the city. La Paz is about 12,000 feet in altitude. The nights are very cold and the houses unheated. No women are employed in the hotels in Arica, La Paz, or anywhere in the High Andes. No English is spoken here. The days are warm and sunny. There was a fine plaza in front of the hotel where we would sit in the sun to get warm. Indians are all over the town in their native costumes. There are more Indians in La Paz than Bolivians, and this proved to be the case in Cuzco, Peru. The Indian men often wore earlaps, but went barefoot. Llamas were driven in flocks on the main streets. On May 1 there was a fiesta and everything stopped: no lights, no trolleys, no taxis. A very interesting and thoroughly foreign city, but poor. The most persistent industry seems to be boot-blackening, and its headquarters were on the plaza about which all the public buildings and the best hotels were grouped. An admirable male servant acted as chambermaid and fulfilled many other duties. Leaving at 7:30 A.M. by train for Gauqui we found the staunch little steamer *Coya* on which we spent the day crossing Lake Titicaca. The *Coya* left Gauqui at half-past eleven, arriving at Puno at ten in the evening. This steamer was built in Scotland, carried in pieces to the lake mostly by

mule-back, and there assembled. Crossing the lake was a truly wonderful trip with mountains on either side, some snow-capped. A colorful Indian procession was seen at one of the little settlements. It seemed to be a wedding or some religious affair, as it disappeared in a church. The braves wore large curious headdresses and all the Indians were dressed in the brightest of colors. On the shores of Lake Titicaca we saw the first of the very high hills, farmed in terraces by the Indians.

"At half past six the next morning we went aboard the train for Cuzco, arriving at 9 P.M. There was no diner on the train so we stopped at Ayaviri for our noon meal where the railway station served the usual course meal, ending with a superb sponge cake made by a brilliantly garbed squaw. The highest point of the journey was at La Raya, 14,150 feet above sea level. A short distance from this station were boiling springs. Cuzco was by far the most interesting city we visited. The old part is entered through large gates. The Inca fortress, Sacsahuaman, is a few miles away on a very poor and precipitous road. The climb to the ruins is a hard one, but the stonework is the most remarkable imaginable. The fortifications are all built of enormous blocks of a fairly soft stone, no cement being used. At a little distance from the fortifications are the throne, the bath, the slide, the seats, and the cave. All but the seats, and even some of them are hewn from a great solid ledge. It would have been difficult for enemy Indians to approach unseen by the occupants of the fortress or of the throne, as the outlook was panoramic. There is more very beautiful Inca work along the sides of so-called Inca Street in Cuzco, being perfectly constructed walls of a dark brown stone. The huge blocks are well cut and perfectly laid, always without filling of any kind. The Temple of the Sun, where women are not allowed, has much Inca work containing Inca rooms, a cloister and the Temple of the Stars. In the one Cathedral (all else are churches) is a wonderful silver altar with smaller altars behind gold bars on either side. There are also fine carvings and very interesting biblical paintings, mostly done by native artists, although some were executed by artists from Spain.

"At six, one cold morning, we left for Macchu Picchu in a railway motorcar chartered for the purpose. We found that in spite of a very elaborate agreement absolving the company from all responsibility, we had been sent out without lights, without a whistle, horn, or bell, and that the company was aware of this in spite of the fact that we were not due to return until late in the evening. A very wonderful ride over and through the Andes, switch-backing four times inside the first hour to make the ascent of the mountain adjacent to Cuzco. Frequently flocks of Indians and heavily laden pack donkeys were met on the single narrow gauge track, the chauffeurs yelling until they were noticed. The first stop was at Ollantaytambo, and a steep and winding climb was made through the very beautiful Inca ruins on the hills.

1893 Continued

How the stones were gotten there and handled is inconceivable. There is a fortress and some of the huge bases of the palace of Ollanto. Some ruins are plainly of a temple, some of dwellings, and there is a remarkably artistic Inca bath.

"Nearly three hours later we arrived at the station of Macchu Picchu. The track lay high above a roaring river on the left, a low line of railway sheds between the river and the track. On the right, slightly raised above the track, stood the hotel, a squalid affair, made apparently of bamboo sticks tied together. Within a radius of a sixteenth of a mile were scattered the tiny rudely built huts of the Indians who were employed in construction work on the trail above the river. All about were practically perpendicular mountains of gray rock and woods, for these were the Andes of the tropics. All along this trail, which ended or rather disappeared into a tunnel, ran the river. We started up the mountain at half past twelve from an elevation of nearly 10,000 feet. Through another tunnel, across a narrow rail-less bridge some fifty feet above the river and the hardest climb we ever took was before us. It was a climb of nearly 2,000 feet, very winding on the edges of precipices and at times very steep. Possibly the worst part of it was a very moist and tropical wood through which we had to pass near the base of the mountain. The top was reached at half past two. The ruins here are even more incredible than those at Ollantaytambo, at both places there being no rock like the ruins on the mountains where the ruins lie or anywhere about. The ruins on the top of Macchu Picchu, though very remarkable, are not as beautiful work as the other ruins we had seen. Largely they are dwelling houses, with endless details of the daily life of the Incas, and many long flights of steps leading from one level of the mountain to another. There was an imposing seat after the order of the great Inca throne at Sacsahuaman, and there was a large building where apparently many people had been in the habit of congregating, whether a council chamber or temple, we did not know. One small room in the ruin of a dwelling house seemed as if it might have been a bathroom as there were what resembled towel racks hewn from the solid stone.

"We started down at three in the afternoon and left for Cuzco at quarter of five. The chauffeurs (there were two as the car had a trick of slipping on the wet rails and at times had to be pushed) had found two oil lanterns and at dark rigged two candles in the headlight. We reached Cuzco in safety at 11:30 that night.

"After Cuzco we started for charming Arequipa, stopping over night at the Ratti in Juliaca, the only primitive hotel we encountered. It was clean and the room opened off a very rickety balcony that ran around a stone-paved courtyard where a donkey, dogs, pigeons, and rabbits dwelled in peace together. Our room had no windows. Early the next morning we waded through Indians in the street and at the station selling their gay knitted things. The highest altitude

was reached at Concerro Alto at noon, 14,666 feet, while eating a very good luncheon served on the train and this applies to all food on trains in South America. At 2:30 Sumbay was passed where terrific gorges with wild streams suddenly came to view. Apparently there were extinct volcanos for miles. There were miles of absolutely barren mountains, only small bunches of stiff scrub grass to be seen. The track lay at a terrific height at the edge of the gorges and took very sharp curves. It was the most wonderful train ride imaginable, and from Arequipa to Mollendo it was much the same till the curious sand dunes near the sea were reached. A most restful, well-fed week-end at delightful 'Quinta Bates' in Arequipa, and on May 13 with the memory of snow-topped Misti smoking and plainly visible for many, many miles, the adventure of the High Andes ended by being slung out in a derrick chair and lowered into a launch in the rough sea at Mollendo and snugly settled aboard the steamer for Callao and Lima. Lima seemed a cheerful, attractive place, much on the order of some of the Los Angeles suburbs. Here is a very remarkable Inca collection, and the Cathedral shelters the bones of Pizarro in a very beautiful mosaic alcove on an altar in a casket of glass.

"The wonder of the great canal was in no way lessened by the experience in the Andes. The day was perfect as all the days had been on this journey. A few more days at sea, a week at Havana where a high room overlooking the blue Caribbean and Morro Castle with plenty of the trade wind, gave a restful breathing space in a very interesting journey. . . ." — **FREDERIC H. FAY**, *Secretary*, 44 School Street, Boston, Mass. **GEORGE B. GLIDDEN**, *Assistant Secretary*, Box 1604, Boston, Mass.

1894

Since our last report, the Class has lost by death one of its very successful architects, Henry L. Newhouse of Chicago. No details can be given at the present time, but in his long career in Chicago, Newhouse had become distinguished for his work in the architecture of the large apartments and of the moving picture theatres. While he has never found an opportunity to attend any of the class reunions, his devotion to the Institute was strong, and a son, Henry L. Newhouse, Jr., was graduated from the Department of Architecture. The sympathy of the Class is extended to his family.

The Secretary made a recent pilgrimage to Pittsburgh where he had the pleasure of addressing the local section of the American Chemical Society, giving a lecture at the Margaret Morrison School of the Carnegie Institute, and of meeting with the local Technology club at a delightful dinner on Friday evening, November 22. Although no '94 men were present, several old acquaintances were renewed and the visit was much enjoyed.

The Class Dormitory Fund has reached the point within a few thousand dollars of the amount required to build our unit.

It is very much to be hoped that those who have not thus far made any contribution will be stimulated by the success which has thus far been obtained and send in their subscriptions, either large or small, so that we may fill our quota during the next few months. Contributions may be sent either to the Secretary or directly to the Institute, but marked for the '94 Dormitory Fund. This statement is made in spite of the fact that the organized effort to secure Alumni funds terminated at the end of the last fiscal year. — **SAMUEL C. PRESCOTT**, *Secretary*, Room 10-405, M. I. T., Cambridge, Mass.

1896

The Secretary reported briefly in the last issue that he was sailing from San Francisco and would supply more details later. The following notes were dated October 15 and were written on the eve of arrival in Honolulu.

With Mrs. Locke he left Boston on September 1 and spent the entire month of September in a rather strenuous trip to all the important mining centers of the North and West, including Houghton in Michigan, Flat River, Rolla, and Joplin in Missouri, Denver and Golden in Colorado, Salt Lake City, Bingham, Garfield, Tooele, and Park City in Utah, Butte, Anaconda, and Great Falls in Montana, Wallace, Burke, and Kellogg in Idaho, Spokane in Washington, Kimberley in British Columbia, and San Francisco. It was exactly thirty days from the time the Atlantic was left until the Pacific was seen at Crescent City, Ore. Incidentally, Mrs. Locke learned how to lay over at junctions for two or three hours in the evening, arrive at destinations after midnight, and leave in the early morning, and she was a good sport.

The final stop in San Francisco was for the three day fall meeting of the American Institute of Mining and Metallurgical Engineers where the entertaining engineers of California did themselves proud in caring for visiting miners and their ladies. The registration for this meeting was over 400. Professor Richards was a leading figure, and many other Technology men were present.

Embarkation for Japan was on October 10 on the Dollar Line *President Jackson* and the N. Y. K. Line *Korea Maru* being the two boats carrying the party of about 350 Americans and Europeans going to the World Engineering Congress in Japan. The Secretary was on the latter boat with most of the Europeans but with also a good sprinkling of Americans, including two Technology Alumni, Calvin W. Rice '90 of the Corporation and George D. Fuller '90. The ocean trip to Hawaii was delightful but uneventful, and was characterized by the usual ship-board routine of eating, sleeping, reading, sports, and so on. This rest was most welcome after a rather strenuous month preceding. The Pacific was true to its name, and *mal de mer* was absent as far as the Lockes were concerned.

In conforming to a prearranged schedule involving many "one night stands" the Secretary was kept on the jump in

1896 Continued

crossing the continent so that it was impossible to stop off and visit classmates. However, one forenoon in Salt Lake City a few minutes were available and Gene Laws and Lewis Cannon were looked up. The former is resting on his oars for the moment, awaiting call from anyone wanting a good smelter man. The latter is following his profession of architecture and has a son coming along for Technology. He had a deal in ranch lands as a side issue and is also developing the idea of coöperative apartments in Salt Lake City. On the way south from Portland, Ore., the Lockes took the famous bus ride over the Redwood Highway from Grant's Pass, Ore., to Eureka, Calif., but instead of spending the night in Grant's Pass, Charlie Newhall took them to his ranch at Medford about twenty-five miles south and returned them in time for the bus the next forenoon. Charlie dispenses old-time hospitality at his thirty-acre ranch which is devoted almost entirely to late varieties of pears, but as a side-line he puts out delicious ripe figs and a brand of Jersey cream that almost requires a knife to cut it. At the moment he was running bachelor's hall as Mrs. Newhall was with her mother, who was ill in Los Angeles, and his boy had just entered Yale as a freshman. Charlie seems to have kept himself wonderfully fit by combining ranch supervision with fishing and duck hunting and wintering in Southern California. Time has not perceptibly removed a single hair from his head or tinged any with gray.

Just before sailing advantage was taken of a few spare minutes to get in touch with some of the San Francisco boys. Actually Walter Leland and Ernie Mead were able to report in person at the Palace Hotel, while Faville and Charlie Hyde were talked with over the telephone. Bowie's office was reached, but unfortunately he was out of town that day. Haseltine, who was supposed to be in San Francisco, could not be located, and his former employer thought he was back in Portland, Ore. There must be something in the climate of the West Coast that acts as a hair preservative or else wives are not so vicious there because Mead and Leland, like Newhall, still retain full heads of dark hair. Mead confessed to having retired from active labor for the present at least, but he stands ready to put a bridge across the Golden Gate whenever the War Department gives permission and the required funds are raised. In the meantime he enjoys life in beautiful Sausalito, across from San Francisco. Leland runs his little ranch at Walnut Creek and has a San Francisco office for the Erie City Iron Works, but his main job is in Oakland where he makes installations of Williams Oilomatic Heaters (radio fans take notice!). Charlie Hyde said that his long promised report on his European trip would be forthcoming soon. Actually his family did not return from Europe until July and Charlie has been on the jump every minute during the past few months. Between his teaching work at the University and

his outside consulting work, he has few idle hours. Faville had a meeting scheduled which prevented him from running across the street to the Palace and joining the party, but he sent his best wishes to all. Classmates will sympathize with him in the recent loss of Mrs. Faville after a long illness.

Final installment of this travelog will appear in the next issue of *The Review*.

—CHARLES E. LOCKE, *Secretary*, Room 8-109, M. I. T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1899

News is scarce and these notes will have but little news, if it is news. It must be able to stand examination by the censor and be approved by those whom it concerns, otherwise it would be classified as libel or slander, to put it politely, and the result is not a happy one.

In October I took a trip into the Middle West and made it a point to visit the Churchill Weavers at Berea, Ky. Churchill did not do his business half justice at the Reunion, and any member of the Class who is in the vicinity of Berea would do well to take a day or two and see for himself how the art of hand weaving has been developed by Churchill.

George Lynch, who had just returned to Los Angeles when the last column was made up, now writes that he is on his way to New York City to do some work on smoke and gas control for the Brooklyn Edison Company. He leaves then for Port Colborne, Ontario, and expects to get back to Los Angeles and get dust systems designed for the Utah Copper Company before Christmas. Lynch is certainly doing his share toward increasing the value of railroad stocks.

I was in New York the middle of November and ran across Frank Fowle at the Engineers Club. Frank is a consulting engineer with offices in the Monadnock Block, Chicago. We discussed our friends and settled the affairs of nations. Frank was going to send me some news but he didn't, therefore I have made news out of him. — W. MALCOLM CORSE, *Secretary*, 810 Eighteenth Street, Washington, D. C. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston, Mass.

1900

Following is a letter which Fitch received from George Gibbs from Paris: "I am apparently a 'no account' person. I did hate to be away when your letters came to me here. I went to America last summer and returned after you had been here, to my intense disappointment. I did mean to write you before, but, however, I am doing it now. Stanley. . . ."

"Last week I called on Dr. and Mrs. Dewey, who had recently flown over from England. How wonderfully well and hale he looks! He was en route from Warsaw, Poland, where he is on some Committee of Expert Statisticians. Of course you enjoyed Europe last year. I know Interlaken and think it very lovely.

"I am now holding down the Cathedral as I do each year in the Dean's absence. He is in England. I can't get any good preacher to help me out and so I have to preach myself to rather large congregations. Dr. Norwood of St. Bartholomew's, New York, and Dr. Reiland of St. George's, New York, both turned me down, but Mr. Reiland, whom I know well, let me down with a dinner. I hope in September to flit about Central Europe, Vienna, and so on.

"Do you ever see Newitt Neal? He and I were together a bit winter before this."

Stratton, who lives in Washington, sends in an account of the funeral services for Wilfred Balcom, principal chemist in charge of food, drugs, and insecticide administration of the United States Department of Agriculture, who died of a cerebral hemorrhage at Georgetown University Hospital on October 17. Balcom was in Course V and also received a Ph.D. from Heidelberg, later teaching at the Institute and at Michigan. A longer and more complete account of his activities was printed in the Club Notes for the Washington Society of the M. I. T. in the December *Review*. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

Some of us remember little Willie Dooley, at least all of the chemists certainly will, for he was the sunbeam of the Chemical Laboratory at the time when several popular songs gave publicity to his patronymic. Some time ago I noted in these columns that after years of silence he had come to the surface again and was making a very definite impression in New York. A classmate, namely one Bill Pepperell, to whom my fervent thanks are due, has recently sent me a clipping anent Willie which I excerpt in part: "Ten years ago, William H. Dooley came to New York from Lowell, Mass., with an idea. This idea was that in the greatest mercantile center of textiles in the world there should be a textile high school. He did not receive any too cordial a reception. There were many uses to which the educational funds could be put, and no important textile mills were within the city limits — certainly none on the island of Manhattan. A few men and women, however, agreed with me and supported him; and the result was that the school was opened in an unused elementary school building at 124 West 30th Street with eighty-four students. Today it occupies several buildings and has an enrollment of 3,500 students, both boys and girls, in the daytime; and 1,000 evening pupils. This rapid increase shows that Dr. Dooley had clearly foreseen a great educational need and had supplied it. The Board of Estimates has appropriated over \$4,000,000 to build a fitting textile high school, and this building is now in the course of construction on West 18th to 19th Streets, between Eighth and Ninth Avenues."

Farnum Dorsey imparts the laconic information that he broke 100 the other day. I never had a bill that size though I

1901 Continued

have understood that they print them. I assume that this must be ostentatious reference to great wealth as Farnum's golf handicap has been around ten for several years. I understand that he is planning to recoup his losses in the stock market by shooting a little golf at the next reunion. Mort Foster and Dennie Haley please notice.

Loring Danforth writes in in favor of the Thirtieth Reunion and suggests as a possible foregathering point Yama Farms which is up in Ulster County, N. Y. As a matter of fact I knew Yama Farms well in the dear dead days before Volstead overshadowed us. It would be a fine place for a reunion. I can see John McGann now, in imagination, counting the trout in the hatchery and pausing at each five million to cheer on some less agile arithmetician. They raise squabs there too, interesting from many points of view. It was one of the many places where John Burroughs was always sure of free food and lodging. The owner had a collection of china over which I yearned, and the Jenny Brook gave wonderful opportunities for fly fishing and some of the more involuntary forms of aquatic sport. They had the finest service in the world, and I have slept there in a Chinese lacquer bed that would have graced a museum had it not been dedicated to the support of my slumberous hours. Personally I'm keen for Yama Farms, the most unique hotel that I ever visited, but I cannot but wonder if it dispenses the same country house hospitality today which was one of its admirable features in the years gone by. Seemingly Dan knows, and I hope he will advise me. We will consider Yama as a possibility.

Charlie Tufts recently wrote me from Petersburg, Va., where he was temporarily stopping. He writes that Charlie Mace, of whom we have lost track for these many years, is Executive Secretary for the Association of Synthetic Organic Chemical Manufacturers. If this be our Charlie and Tufts is right, he may be able to help us to make the Thirtieth Reunion what it might have been should we elect Yama Farms. Incidentally if anybody knows where the executive secretary of such an organization might find his abode, I wish he would let me know. These syntheses take a long time and the Thirtieth Reunion approaches.

Good old Ellis Lawrence as usual kicks through with some real information. Among the items which I may hope to get by the jealous editorial eye are the following: — Bill Sayward was reelected Vice-President of the American Institute of Architects at the May meeting in Washington. — Ellis himself is serving on the city planning commission of Portland, Ore., and is taking an active part in a scrap now on to develop a modern waterfront for that transplanted New England city. — Trenholme is teaching at the Washington High School in Portland, Ore.

Bill Holford's small son, William, aged fifteen years, has just received the highest Boy Scout medal for saving a small girl from drowning. He has been

recommended for a Carnegie Medal as well. As I remember it Bill used to be interested in the girls, too. Ellis writes that the father is very active in Boy Scout work. I hope that when Bill comes on for the Reunion — to which, by the way, he is pledged — that he will organize a Jamboree for us. There are several members of the Class whom it would be worth a long journey to see in shorts and I will guarantee a long list of good deeds for the daily exercise. Thus do I indicate by indirection that I am a Boy Scouter too. Hail brother!

Edwin Church who is still at the Brooklyn Polytechnic took a trip through the Rockies last summer and foregathered there with Harry Dart who is in the insurance game in Hartford, Conn. It seems a long way for a rendezvous, but I presume there are reasons. Myself an unmarried man I find that the home ties chill the warmth of a welcome which in unregenerate days could always be counted on.

One more bit of news of which I shall write you more. This June we are to have a five-year reunion of the entire Alumni Association. Without prejudice to the more intimate and select gathering which will dawn in 1931 I hope that the Class will have a massive representation. Charlie Bittinger, the faithful, is coming on from Washington, so that I will not be wholly alone, but I will guarantee a good time to any of you who will risk the rigors of New England travel. A letter will reach you shortly giving you details and urging your attendance. — ALLAN WINTER ROWE, *Secretary*, 4 Newbury Street, Boston, Mass. V. FRANK HOLMES, *Assistant Secretary*, 250 Stuart Street, Boston, Mass.

1902

Red Proctor has been in the despatches lately in his capacity as President of the New England Council. He attended one of the conferences of business representatives which President Hoover called to urge an increase in construction work and other economic measures to strengthen the condition of the country after the recent crash in the stock market.

Greeley is President of the New England Regional Planning League. He has been Chairman of the Planning Board of the Town of Lexington for years and more recently of the Massachusetts Federation of Planning Boards. Roger is one of the forward-looking spirits who has come to see that the problems of urban growth are larger than any local planning board can deal with. At the November meeting of the Alumni Council he made an eloquent address, presenting the whole subject of planning for the future growth of those districts which center around our large cities and urging the establishment of a course at the Institute which would train men to deal with planning in a large way.

Adrian Sawyer is renewing his acquaintance with the South Station in Boston. Some years ago when he was with the George A. Fuller Company, he erected an addition to the office portion

of this building. This operation involved some interesting problems in building construction, as columns had to be carried down through the existing building to carry the added stories and foundations put in for them without interfering with the operation of the building. Adrian is now engaged in rebuilding the platforms in the train shed and erecting track awnings, and when these awnings are completed he will take down the roof of the train shed and the great trusses that support it. — FREDERICK H. HUNTER, *Secretary*, Box 11, West Roxbury, Mass. BURTON G. PHILBRICK, *Assistant Secretary*, 246 Stuart Street, Boston, Mass.

1904

I sincerely hope that you have just passed through a very happy Christmas season and that there stretches before you a very happy and prosperous New Year. Of course, the coming year cannot have in it any such event as the Twenty-Fifth Anniversary of the Class of '04, because such things come but once in a lifetime. We can, however, look forward to another of our annual reunions and hope that we may have a goodly attendance next June.

Some of the items chronicled in this issue may bear the earmarks of ancient history, but you must remember that these notes have to be sent to *The Review* more than thirty days previous to their appearance before the public eye.

From time to time Mert Emerson has sent post cards from various points on his pilgrimage through Europe, indicating that he enjoyed himself thoroughly. One from Paris dated October 6 stated that he had had lunch with Selskar Gunn the previous day and that he had visited the church that morning to hear Canon George Gibbs '00, with whom he expected to have luncheon on the day he wrote the card. Mert expected to return to this country about the time this letter was compiled, but I had not received any word of his arrival.

During the past summer Carle Hayward took a trip through the West and during this trip he eventually arrived in Monterey, Mexico. The advent in such a district of a member of the Department of Mining and Metallurgy naturally caused a great deal of interest amongst the Technology men in that town. A dinner was held at which Carle and fourteen out of the eighteen Technology men in Monterey were present. Three out of the other four were out of town and unable to attend. At this meeting, which was very enthusiastic, the Technology Club of Monterey was formed and Carle was instrumental in its organization. He was appointed representative of the Monterey Club on the Alumni Council at the 141st Meeting at which he spoke regarding the enthusiastic reception and the interest of the Monterey Alumni in forming a new club.

All of Carle's friends will be very glad to know that he has burst into the select circle of authors, having produced a very comprehensive volume entitled "Outline of Metallurgical Practice"

1904 Continued

which is very aptly described in the following clipping from the *Canadian Mining Journal* of September 20: "The task of compiling all the essentials of the metallurgy of the numerous metals used in modern manufacturing and the arts, and presenting them in a readable manner instead of a cut and dried citation of facts, is a monumental one; but it has been most effectively completed in the above volume. It is modestly entitled 'Outline of Metallurgical Practice'; but it is really much more. The author traces the metallurgical practice of twenty-two metals, not to mention a chapter on non-ferrous alloys. This is, in itself, no small task for one volume — even if it does consist of 612 pages — yet he has captured all the essentials of his subject, and he gives, in addition, a vast amount of accessory information such as the physical and chemical properties of the metals, tables of production, details of ores, and sources of supply, and so on. He finds time to discuss such things as the manufacture of zinc retorts, and one finds innumerable interesting little items scattered all through the book.

"The author has the happy knack of presenting his facts in a succinct, and yet highly readable manner. He is not long winded; and at the same time his style is such that it does not convey any impression of undue brevity. He has helped the presentation of his subject by the use of a large number of flow sheets of processes, and illustrations of equipment. There are 140 illustrations and sixty-six tables to be precise. Altogether an intensely interesting book that will fill a long felt want as it covers, most completely, a highly diversified subject, and it is a gold mine of information that should be in the library of every engineer."

As a result of the seed planted by Gus Munster's remarks at the Twenty-Fifth Anniversary regarding the obsolete type of transportation used by the Secretary of the Class, it might be of interest to those who were present to know that the small tin automobile that Gus presented at that time and which he stated had come from the palatial emporium of Alvan T. Fuller has now grown to a full-sized car from the same source. In order to show off a little and indicate the pride of possession on Armistice Day, I happened to be passing through the Town of Reading and stopped to call for a few moments on Ed Parker, and found that I was not the only member of the Class who had acquired a new vehicle, as Ed was standing, wrapped in admiration, looking at a brand-new Buick coupé. These personal remarks are not inserted here for the purpose of exciting the envy of any of our classmates but merely for the purpose of filling up some space in these notes.

Another personal item to be mentioned is the fact that Phil Sweetser is now a member of the University Club of Boston. — Just before I wrote this set of notes Gene Russell called in for a moment, but did not sell any insurance.

From the foregoing it may be readily seen that the first crop of news for the 1930 season is no more prolific than is

usually the case, but I hope a small start may result in a large finish. — HENRY W. STEVENS, *Secretary*, 12 Garrison Street, Chestnut Hill, Mass. AMASA M. HOLCOMBE, *Assistant Secretary*, 3305 Eighteenth Street, N. W., Washington, D. C.

1905

Did anybody ever hear of any one writing to a class secretary before breakfast? Never! It has actually happened. John Damon woke up in the Proctor Inn, Proctor, Vt., at five A.M. one morning and sat right down to apologize for having driven through Middletown without saying "hello" to your Secretary. He blames it on the Post Jefferson Ferry, but why? He writes: "The last half of September to the first half of October I spent on the upper peninsula of Michigan studying some water power problems and it was a very pleasant assignment, being the first real traveling I have had for a long time and in a part of the country I had not been in before. I met a few Technology men, but had to represent '05 all by myself. The wood chemical industry going on in a moderate way interested me, but I didn't have time to visit Henry Ford's new plant at Iron Mountain. Today I am up here in Vermont on some more water power work. There is something so nice and clean and smokeless about water power that I enjoy getting into it whenever the opportunity presents."

Dick Senger completes the story of his travels in Spain. "The south of Spain is just as much of a curiosity to thousands of Spaniards living in the north and central part of the country as to a foreigner. In fact most of the tourists I came in contact with were north Spaniards and they were digging into their guide-books about as hard as I was. The physical characteristics and mental make-up of Spanish types in different parts of Spain was of great interest. The Sevillano and the Madrideno, and the Mayorcan, have more differences in physical make-up than folk from Maine, Georgia, or North Carolina. At the same time they have certain fundamental characteristics that are common to all — the same lack of nerves, the beautiful habit of tending to their own business, and of being courteous to all strangers who speak to them. The stranger, however, is expected to speak first, as it would be considered impertinent to speak to the stranger first.

"I will not bore you with a long description of what I saw. I advise you, however, to take in the Balearic Islands if you ever make the Spanish trip. Also, do not expect to see anything like the Hollywood edition of Spain in Spain itself, because if you expect any such thing you will be disappointed. The women are obviously charming, good looking, and mostly good. The Carmens are imagined by Frenchmen and other foreigners. Neither are the men dashing around the alleys, knife in belt, looking for somebody to make love to as a preliminary to cutting up some one else. The Spaniards are the most energetic people I ever saw in my life — another misrepresentation exploded. Everything they do is done with energy, although they do seem to hate to finish anything. The hotels in the larger Spanish cities have good accommodations, and are in fact modern in every way. The trouble with such a trip is that it is a teaser to go again — go farther and stay longer." Thank you, Dick.

The Sampson and Murdock Company was awarded a handsome trophy at the Annual Direct Mail Advertising Convention in Cleveland for the best mail advertising campaign with letters a prominent part. This campaign was for the Copley-Plaza Hotel, Boston, and was written and planned by Charlie Hawkes, manager of the Direct Mail Advertising Division of the Sampson and Murdock Company. According to the report of the award committee, "In addition to strict compliance with the rules governing this award, this campaign is outstanding in the nature of its copy appeal, is distinctly appropriate in its form and color. In all around plan and continuity it conforms, in our opinion, to the advanced practices of modern direct mail selling. Most important, and logically enough, the Copley-Plaza campaign achieved remarkable sales per dollar of expenditure." Congratulations, Charlie.

Harry Wentworth read the first installment of Frank Payne's trip across the Pacific and forthwith decided, "Me, too," and joined the engineering expedition to Japan. The following note was dated Honolulu, October 16: "I would wait till after the Technology luncheon tomorrow and write you a note, but we have to hustle for the boat from the luncheon and then no mail until from Japan. There are eighteen Technology men in the party, all but two of whom are in earlier classes than I: one of the '68, two of '75, one of '76, and so on. Enclosed is a note from Professor Richards, whom we fixed up for a masked ball a few nights ago.

"I have had a very interesting trip thus far. The enclosed clipping will give you the diversification of the bunch. We had a special train to Washington (where the President received us, and the Japanese Ambassador gave us a dinner) to Chicago, the Grand Canyon, Los Angeles, San Francisco, and here, and we were royally entertained everywhere. In San Francisco the committee fixed me up for a game of golf and one of my foursome turned out to be Moorehead '05. He looked happy and prosperous."

According to the clipping, from the Honolulu *Star-Bulletin*, "Colorfully costumed Japanese and Hawaiian girls decorated each passenger with a flower lei as he stepped ashore." And look! A picture of Mr. and Mrs. Wentworth wearing their decorations, Harry looking worried lest his be not becoming. Did they give you the lei, when you were there, Frank?

In one issue of the Boston *Evening Transcript* appeared photographs of Roll Prichard's daughter, Katharine, in bridal gown, and Sid Strickland's debutante daughter, Eleanor, who, according to

copy, was starting for California with her parents. They are to return late in December. — Milton Rubel has bobbed up in Hollis, N. Y., and Charlie Mayer has transferred his activities to Brooklyn. We have been unable to get a word from either.

Harry Nabstedt writes from San Francisco: "The Garcia Dam, now called Presa Rodriguez, in honor of Governor Abelardo Rodriguez, is coming along nicely and is attracting world-wide attention due to several extraordinary conditions connected with it. I turned this work over to one of the construction superintendents after the construction plant was in position, the job completely organized, and the site ready for the placing of concrete. We organized the Ambursen Dam Company to cover the Pacific Coast territory, and I am doing my best to keep our construction organization busy. I spent a day with W. E. Simpson in San Antonio recently. He is doing finely and is considered one of the outstanding engineers of the Southwest. His forte is foundation and structural work and he has many large modern office buildings to his credit."

And speaking of Simpson, here we are: "Harry Nabstedt has dropped in on me periodically about every six months for the last two or three years and we certainly enjoy the few hours we have together when he comes. This last time we both promised each other that we would drive to Boston in our cars for our Twenty-Fifth Reunion, taking our families along, and I surely hope nothing will break in on my plans this year, as they have done at every reunion before, and knock me out of this trip. (Good idea, this. Think it over, all you from beyond the Alleghenies.) Harry is about the only member of the Class whom I have seen in the last four or five years. They don't seem to come this way very often. I enjoyed the first installment of Dick Senger's record of his travels abroad this summer and naturally will be looking forward to the rest of it in his next article."

We gather from the letterhead that Willard is the It of W. E. Simpson Company, Inc., featuring foundations, buildings, bridges, industrial plants, highways, water power, water supply, sewerage systems, examinations, and appraisals, which would seem to be a broad enough field for anybody.

The following article, referring to Reynolds Harding, manager of the Columbus Electric Light and Power Company and the South Georgia Power Company, appeared in a Columbus, Ohio, paper: "The birth of Bill Harding was registered in Roxbury, Mass., in 1882, and he spent his boyhood years in the City of Culture, choosing Technology as his Alma Mater. Upon his graduation in 1905 as a civil engineer he entered the employ of the firm of Horton and Hemenway, leaving them some year and a half later to join the Stone and Webster organization as statistics department student. After serving a short apprenticeship here he was assigned to the Savannah

Company, where he spent several months in various departments studying at first hand the operating problems of both the light and power end, and the railway.

"Early in 1909 an opportunity came for Bill with the company at Pensacola and here he took over the position of assistant lighting superintendent, in a few months being appointed superintendent. His next problem came some three years later when he was assigned to the general superintendency of the Columbus companies. His appointment as manager came early in 1919, and during his administration there has been a steady growth of all the utilities in this group.

"The Columbus Electric Light and Power Company and the South Georgia Power Company are fortunate in having had a man of Mr. Harding's ability, temperament, and fine personal character, at the head of their affairs for such a period of time. He has served his company well and has served his communities well. A good citizen and thoroughly deserving his personal popularity, he has been the recipient of many public honors, and these he has carried very modestly. Lake Harding, a body of water embracing more than ten square miles of water, created by the Bartlett's Ferry Dam, was named for him, and we, his friends, are proud and happy in the thought which is behind this christening." Congratulations, Bill, on the record which you have made!

Bob Cutting now concludes his story: "Back in this country again, I did some work on a large coal mine development, consisting principally in tunneling through bad ground and lining the tunnels with concrete. It was interesting, principally on account of the difficulties to be overcome. I have lived too much in the sunshine, however, to get enthusiastic over tunnel work.

"In 1924 my old chief, the army officer under whom I first worked on the Ohio River and who was the consultant for the Australian work, retired from the Army and I joined him in consulting work. Our first job was the harbor for Long Beach, Calif., followed a little later by some similar work in Florida. Having jobs running simultaneously on the Pacific and Atlantic made travel a necessity and I made nineteen single trips from coast to coast in the next four years.

"Last September we went over to Europe for some consultation work in France and Spain. The chief is returning here shortly and we contemplate establishing an office either here in New York or in San Francisco, depending on circumstances connected with some prospective work. The locus of headquarters does not seem to mean much in our case because, unfortunately, harbors have to be built and rivers improved in the location where nature placed them — a job for the Educated Tramp." Thanks, Bob.

And now, at the turn of the year we came to a subject that has been only lightly touched upon. We refer to our Twenty-Fifth Reunion, for there is to be a Twenty-Fifth Reunion and it's coming

along pretty soon now. It is too early to talk details but it is not too early to begin thinking about it, and, like Willard Simpson, you should begin to lay your course for Boston in June. — ROSWELL DAVIS, *Secretary*, Wes Station, Middletown, Conn.

1906

Time for November 23 refers to a conference held at Harvard University, attended by President Lowell of Harvard, Rabbi Levi of Boston, and Reverend Michael J. Ahearn of Weston, Mass. The conference afforded opportunity for discussion of the common problems of the three religious groups. Reverend M. J. Ahearn is an '06 man, Course XII. Our records show that in 1913 he was Professor of Chemistry and Geology, Canisius College, Buffalo, N. Y. In 1920 he became President of that institution. The 1925 address shows him at Holy Cross College, Worcester. At present he is Professor of Chemistry, Astronomy, and Geology at Weston College, Weston, Mass. Recently he has given some radio talks over one of the Boston stations. I am advised by one who has listened to him that he is a good speaker and his talks are excellent.

The following clipping has been received. The clipping does not indicate from which paper it was taken, but it probably was extracted from the publication of the American Institute of Mechanical Engineers, which is the society referred to. "Harold V. Coes, nominated for manager of the Society, is industrial engineer for Ford, Bacon and Davis, of New York City. Up to three years ago he was Vice-President and Manager of the Belden Manufacturing Company of Chicago. Mr. Coes has been an active member of the Society since 1907, and is an outstanding example of the type of man who is willing to devote considerable time and energy for the benefit of the organization. He has served as a member of the Standing Committee on Professional Divisions, Chairman of the Materials and Handling Division, and a member of the Special Committee on Development of the Income of the Society from Business Activities. Mr. Coes was the editor of the section in the handbook on materials handling. He is now chairman of the Finance Committee and is on the special council committee on meetings and budgets, Conference Committee. Mr. Coes is a graduate of Technology."

Science for October 4 includes a notice in regard to the death of George F. White: "Dr. George F. White, Professor of Chemical Engineering in Clarkson College of Technology at Potsdam, N. Y., fell down a flight of stairs and was instantly killed on September 18. Dr. White for the last five years had been chemical engineer and director of the science department of Bauer and Black, of Chicago." Class records show that Professor White graduated from Course V. In 1913 he was Associate Professor of Chemistry at Richmond College, Richmond, Va. Two years later he was Assistant Professor of Chemistry at Clark College, Worcester, Mass. From

1906 Continued

this position he gave up teaching temporarily to affiliate with Bauer and Black, as included in the notice.

The Secretary attended a telephone transmission conference in New York the week of October 18. Otto Blackwell participated in the conference and Burton Kendall was one of the attendants. Both of these men are taking a very active part in the new developments in telephone transmission. — JAMES W. KIDDER, *Secretary*, 8 Harrison Avenue, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

1907

Charles E. Baker is district manager of the Trimount Dredging Company of Boston, located at Meadow Street, Stamford, Conn. — Harold A. Kingsbury is with the patent department of the duPont Viscolic Company at Arlington, N. J. — From the Alumni Office has come the address of Rue des Peignes, 65, Antwerp, Belgium, for A. T. Kolatschewsky. — Frank MacGregor writes us that Ernest F. Lewis returned on November 7 from a vacation trip of six weeks in England and France.

Winslow D. Robinson, who has been a salesman and engineer with the Federal Mutual Liability Insurance Company in Boston for the past nine years, opened, on November 21, an office at 110 Milk Street, Boston, for the conduct of a general insurance business. — Erle F. Whitney has left Portland, Ore., and is manager of the General Electric Company at Union Trust Building, Cleveland, Ohio. — BRYANT NICHOLS, *Secretary*, 2 Rowe Street, Auburndale, Mass. HAROLD S. WILSON, *Assistant Secretary*, Int. Shoe Company, Manchester, N. H.

1908

The first bi-monthly dinner of the 1929-30 season was held at Walker Memorial on November 12. There was good attendance, the following being present: Davis, Coffin, Tim Collins, Skillings, Appleton, Ferrandi, Sewell, Merrill, Cook, Esten, Booth, Clark, Heath, Toot Ellis, Abbott Thompson, Lincoln Soule, Beede, Gurney, Mayo, Towle, and Carter. Following the dinner we adjourned to the high-voltage testing laboratory of the Simplex Wire and Cable Company of Cambridge, where we witnessed a very interesting exhibition of high voltage with both alternating and direct currents.

The second get-together dinner of the season will be held on February 12 at Walker Memorial at 6:30. The usual notices will be sent, and we trust for a larger attendance.

Philip J. Hale is now to be reached at Room 1638, 310 South Michigan Avenue, Chicago, Ill. — William F. Grimes, Jr., is living in Fair Lawn, N. J., where mail will reach him at Box 13. — Harry S. Chandler's new address is 32 Baby Point Road, Toronto, Canada. — Harold Gurney is at 1803 Beacon Street, Brookline.

One of the people whose accomplishments have been recorded recently in the "People You Ought to Know" column

of the Boston *Herald* is Miss Mabel K. Babcock. Since graduation she has done a great deal in the field of landscape architecture; and for a few years before she was an instructor at Wellesley College, where she also did much to help beautify the campus. During the war Miss Babcock was a member of the Institute war service auxiliary which saw to the handling of funds and information supplied by Technology Alumni. She was also President of the Technology Women's Association during this time. One of her achievements of special interest to Technology is the garden which she designed for the late President MacLaurin, and which remains today, for President Stratton, as it was originally planned.

John T. Ellsworth is now living at 734 North 23d Street, East St. Louis, Ill. — Albert E. Emery is working with the United States Rubber Company at Naugatuck, Conn. — Robert T. Pollock may be reached at 25 Broadway, New York, N. Y. — Arnold Heath is living at 3 Pineway, Wellesley, Mass.

Your Secretary is now living at 14 Roslyn Road, Waban, Mass. His office address remains the same. — HAROLD L. CARTER, *Secretary*, 185 Franklin Street, Boston, Mass.

1911

With our own glorious Twenty-Year Reunion scheduled for June, 1931, it is a pleasure to urge classmates to attend the 1931 All-Technology Reunion, now definitely scheduled for June 6 and 7, 1930. The particular reason it will be wise to attend this year's affair is that you will find a lot of '11 men in the huge throng that is anticipated by Tom Desmond and his committee and we can, therefore, have an opportunity to talk over in advance our own 1931 plans.

I met Jack Herlihy II and C. R. Johnson X at the November Alumni Council Meeting in Walker Memorial. C. R. leaves Boston on December 1 to return to Akron, Ohio. While here in the East he has been with Godfrey L. Cabot, Inc., and has resigned to enter sales promotion work with the Philadelphia Rubber Works at Akron. Jack, on the other hand, is still with the Edison Company here in the Hub, as is Tommie Haines II, both being division superintendents, the former of the supply and the latter of the maintenance of lines division.

I expect to go over to New York on December 2 for the annual banquet of the Technology Club of New York, and as Dick Ranger VIII will be toastmaster there will, of course, be a lot of '11 men there. I will tell you all about it in the next lot of notes.

While in New York in mid-November I had a delightful renewal of acquaintance with Whitford Drake XIII-A, who is an officer of Electrical Research Products, Inc., a subsidiary of Western Electric Company. That's the crowd, you know, who took the Movietone pictures of the Institute in 1927. Whit is doing finely and his former Annapolis buddie, John Otterson '09, is President of the company.

We still have two classmates on the staff at Technology, Gordon Wilkes II, Associate Professor of Industrial Physics, and Ralph Adams II, Assistant Professor of Testing Materials. — Ed Woodward VI, who is in Chicago on the editorial staff of *Railway Age*, writes that he expects to be in New York during December for a staff meeting and hopes to spend a few days in Massachusetts and Maine.

Please note, classmates, the brevity of these notes. Then stop and think: "When did I last write to Dennie?" You like to read about your classmates. The reverse is also true, your classmates like to read about you. Write to Dennie! — ORVILLE B. DENISON, *Secretary*, 32 Reed Street, Lexington, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

Some letters sent out to members of this Class are returned by the post office undelivered. That's because we haven't your correct address. Right now the Institute is preparing its "1930 Register of Former Students." Blanks have been sent out to secure your latest address and business connections. Be sure to furnish the data requested and mail in your blank. If you didn't get one it's because they haven't your correct address now. Write in to the Institute at once so as to be sure you are properly listed in the 1930 Register. And if you haven't heard recently from either Shep or Mac it's probably because our letters are not delivered. Write in and give us a chance at least to know where you are.

A brief note from J. M. Hargrave VI, President of the Cincinnati Tool Company, Cincinnati, Ohio, advises us that he's still on the same job and has made no changes since last reported. — We have tried every means except radio broadcasting to get in touch with Paul M. Tyler III to no avail. A few weeks ago we ran across an article in the esteemed Boston *Evening Transcript*, entitled "Cadmium Metal Has Many Varied Uses," and the article turned out to be an excerpt from a report by Paul M. Tyler of the United States Bureau of Mines. We believe that this is our Paul and hereby give him credit even though he won't answer our letters.

Your Assistant Secretary enjoyed a luncheon date with L. W. Chandler VI a short while ago. Chan was visiting New York on business for Graton and Knight Company, Worcester, Mass., and phoned us just about lunch time. Your Assistant Secretary is always glad to eat with the visiting firemen — especially when they pay for the grub. Thanks, Chan. Come again! Chandler is now assistant to the President of Graton and Knight Company, and is actively engaged in sales promotion. He is also a member, and an active one, of the Technology Alumni Council. We signed him up on the spot for a working member of the 1932 Reunion Committee.

This Twenty-Year Reunion was the subject of a lively discussion at a recent New York meeting. The attendance

1912 Continued

wasn't large, but it was live. C. A. Cary I, L. A. Matthews VII, Lester White X, and your humble Assistant Secretary were the guests of honor at their own little 1912 party. We now have about ten classmates, altogether, pledged to attend this 1932 brawl if they live. Why not write in to Shep or Mac and tell us to add your name to the list of the do-or-die boys.

Your Secretary, having about fifteen minutes before train time in Washington, D. C., phoned T. B. Lawler VI and found him at home. Lawler is now Secretary of the International Bank, Washington, D. C., and extends an invitation to any '12 men who may be in need of funds in or about Washington, to drop in on him. Lawler boasts a family of two daughters.

While in Chicago your Secretary did his best to get in touch with H. A. Babcock II. Bab is a man of affairs, as on the first try, he was in conference, and on the second try, was out of the office for a short time. He did go so far as to leave word with his secretary for me to have dinner with him, but unfortunately, I was unable to accept. If the invitation still holds good on my next trip to Chicago, I shall certainly take advantage of it.

In Cleveland, I had a few minutes chat with Carl Rowley II. Carl tells me that the recent stock market slump has somewhat upset the architectural trade, as several of his jobs have been held up. Here's hoping it is not for long. Carl is just finishing a large residence at Hyannisport and is just starting work on a large residence in Wellesley Hills, Mass. What is the matter with our eastern architects that they aren't taking care of this business? Just before catching my train, I had a chance to drop in on Ralph Stone II, District Manager of the Sullivan Machinery Company in Cleveland. Ralph has signed on for the Twenty-Year Reunion, thereby increasing the old guard to eleven. Who will be next? — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. McGRATH, *Assistant Secretary*, McGraw-Hill, Publishing Company, Inc., 10th Avenue and 36th Street, New York, N. Y.

1914

An All-Technology Reunion has been decided on for early in June. This Reunion will be held at Cambridge. One of the outstanding class events of the Reunion will, beyond any question, be a 1914 dinner. Make your plans now to come to Cambridge next June to look over the new Institute and to take part in the 1914 dinner!

The past month has brought in a large number of clippings regarding our illustrious classmate, Porter Adams. Pat has decided to take a rest this winter, and is at the Desert Sanitarium, Tucson, Ariz., where he will be glad to receive letters from all '14 men. There has been so much material regarding Pat to select from, that it would be difficult to comment on all of it. It extends from "Favorite Bible Quotations of Famous Men," clipped from the Poughkeepsie Star, to "People You Ought To Know," running in the

Boston Herald. We all know Pat so well that there is no need of quoting from many of these articles, which summarize his manifold accomplishments. "Bob Washburn's Column" in the Boston Evening Transcript, however, had such a concise summary of Pat's great accomplishments, that I am going to quote it: "Porter Adams, former President of the National Aeronautic Association, at Washington, qualifies for the top of the Weekly, today. He has gone to Arizona, to rest and recuperate. The Scriptures say that the birds of the air have nests, but this bird of the air nests now only because for the first time in a virile and a versatile career he is weary. His high talents he has concentrated preëminently on aeronautics, and God gave him many, a good head and a big heart. He came out of Thetford, up on the Connecticut, near Dartmouth, and out of Brookline. He did his part in the war. He always does his part. It's his way. His high spirit then overdrew his physical resources, which has finally led to his temporary retirement, often the price of patriotism."

"He is a writer of no small excellence. He wrote a picture of the tragic death of Zach Lansdowne in the *Shenandoah*, whom he knew well, which the combined heads of A. S. Hill, Barrett Wendell and LeBaron Briggs could not have beaten. He fastened his fancies on flying. Godfrey Cabot, another eagle and connoisseur of men, says of him: 'He has exceptional executive capacity and good judgment in many ways. He is the very quintessence of thoughtfulness for others. He has been most unselfishly devoted to the promotion of aeronautics.'

"Porter Adams has always led the way. He has another quality without which all others are futile. He appeals to men. This means spur and coöperation in vocations and cheer in avocations. In his profession he made the peak at Washington, at the head of the National Association. As a flyer he is an adept in the heavens, a star in constellations."

Every '14 man will wish Pat the best of luck in getting back his old-time strength and vigor. Just because he is out in the desert region does not mean that his sense of appreciation for humorous stories is in any way dulled. There is nothing that would cheer him up so much as to have his former associates write him occasionally, sending him the latest stories.

Another '14 man who has decided to lay off this winter is Dean Fales. Dean has been inhaling the B. t. u.'s and all the oxides that go with them from the exhaust of the engines in the motor laboratory at Technology for so long that his system is filled up with carbon monoxide. Dean has, accordingly, taken a leave of absence for this year to play around a bit and build himself up again from the mere 240 pounds to which he has wasted away. Just what he will do to rest up has not been planned yet, but knowing Dean, we can take a good guess. Dean says that it will probably be a winter in the South, along the Florida coast, but we are planning on buying postage that will take letters across to Havana.

THE TECHNOLOGY REVIEW

After the best part of forty years of single blessedness, Nemo Newlin has decided that being lonesome has nothing in life for him. The following clipping from the New York Times tells the story: "Mr. and Mrs. Frank Battles of Echo Valley Farm, Newton Square, have announced the engagement of their daughter, Miss Elizabeth Bell Battles, to Earl Mortimer Newlin, son of Mr. and Mrs. William Ver Plank Newlin of Wayne. Miss Battles is a member of the Merion Cricket Club, Colonial Dames of America, and the Daughters of the American Revolution. Mr. Newlin, a World War veteran, was graduated in 1914 from the Massachusetts Institute of Technology and is a member of the Racquet and Merion Cricket Clubs." — HAROLD B. RICHMOND, *Secretary*, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, *Assistant Secretary*, 21 Vista Way, Port Washington, N. Y.

1915

It is open season on class dinners. The success of our first dinner this fall in New York on November 21 at the Technology Club was due to good Jim Tobey's efforts and interest in handling the details. Those present were C. H. Durkee II, Jerry Coldwell VI, Chris Wolfe I, Vic Enebuske I, Jack Glynn I, Jim Tobey IX, O. R. Freeman IV, B. E. Fields X, and myself. An error in our mailing list caused the unfortunate omission of the New Jersey men. Otherwise I know these fellows would have come. We surely missed them. H. W. Anderson planned to come up from Philadelphia, but wired at the last moment his regrets. Louis Zepfler phoned he was coming, but did not. He probably got soaked in the Jersey marshes on the way over.

Well, we talked of cabbages and kings, with Fannie Freeman entertaining us howlingly with stories of his personal experiences with the intrigues of city politics versus an architect's ideals in the decorating of the new municipal auditorium at Atlantic City, of which he had charge. Funny! You should see and hear Fannie. Then Jerry Coldwell in person. The first time I've seen Jerry and Durkee since that memorable June, fifteen summers ago. Jerry is just a regular fellow and I am sure he must create the impression in the contacts in his work that engineers, at that, are human and have a sense of humor. Next to the recent market crash, the most important subject was our coming reunion. This will fall on the end of the week, during which the general All-Technology Reunion will be held, June 6 and 7. The boys were for making it stag and agreed that any place near Boston would be acceptable to most of our men. It was a pleasant evening together.

We held our first Boston dinner on November 25 at the University Club. Twenty-three men came, the largest number to attend a class dinner since I've had this job, and I believe it was due to the loyal and kind coöperation of the key men I asked to look up other men and to the spirit and interest of the fellows in

1915 Continued

supporting our Class. In their order around the table sat Carl Wood I, Frank Scully I, Seward Highley I, Clive Lacey VI, Herb Swift II, Loring Hayward I, Charlie Norton II, Art Nelson VI, Pirate Rooney I, Mitch Kaufman X, Jac Sindler X, Larry Landers X, F. E. Waters II, Abe Hamburg V, Max Woythaler V, Jack Dalton X, Ralph Joslyn X, Al Sampson V, Arch Morrison II, Easty Weaver XIV, Whit Brown IV, Evers Burtner XIII, and myself. That was a great crowd and a great dinner. The stories were funnier this year and cleaner, Carl Wood, however, leading the assault on our high standards. Frank's playing brought out some of our old songs, especially fitting was the singing of the Stein Song to close the evening. George Rooney, lacking the unmoral support of John O'Brien this year, worked alone and nearly stopped our show with his recitation. Marshall Dalton planned to come but phoned he couldn't and sent his best regards. We swapped good natured business and personal experiences.

As to the reunion, someone suggested Montreal, and after the dust cleared away and the body was removed we decided that some nearby place could be just as damp. We shall follow the general plan of our Tenth Reunion in having sports and activities of varying natures, to please and accommodate all. There were roughly about sixty men at our Tenth and this year we should have seventy-five. So talk it up, all you fellows, to everybody you see, so we'll have a great big happy reunion.

It was a splendid evening and I hope we can have more like it. Then followed the annual bowling. George Rooney, Jac Sindler, Arch Morrison, Frank Scully, Jack Dalton, Al Sampson, and I matched our age and increasing waist lines against whatever you want to call it. It is a marvel how some of the boys can do it. Anyway, it was a jolly finale.

In Buffalo recently I had dinner with Sam L. Willis III, who has left the Corning Glass Company to sell conveyor systems for the Lamson Company of Syracuse. He said Otto Hilbert is still at Corning. — R. W. Reynolds VI is around Boston. — In New York I failed to reach Mrs. Holway by phone for word of Bill. I hope she's not in Russia, too.

Dick Knowland X is production superintendent for Bigelow-Hartford Company, carpet manufacturers at Thompsonville, Conn., and will soon move to New York. I had a pleasant ride into New York with him recently.

This is my third month without a line from any of you. How much longer do you think I can hold out? There ought to be a lot to write about now. How's for some ideas and lines on the Reunion? So shower down, boys, let it rain letters. — AZEL W. MACK, *Secretary*, 377 Marlboro Street, Boston, Mass.

1916

All of the Class will be pleased to get news of Ed Kaula, who has not been heard from for a long time. The following clipping was kindly sent to me by

Ed's family in Somerville. Ed is married and has two sons, Bill three and a half, and David one year old. The news comes from the other side of the world.

"A prominent figure in the oil business in New England is Edgar Louis Kaula, managing director for New Zealand of the Texas Company (Australia), Ltd. He is an example of a young man succeeding in business and that success has been brought about by an intensive training in all matters pertaining to oil.

"Born in Boston, U. S. A., he is a graduate of Technology. He is a Bachelor of Science and possesses high academic honors in chemical engineering. It will thus be seen that Kaula's early training specially fitted him for the post he now holds, and his ten years of association with the Texas Company has greatly added to his knowledge of the executive side of oil merchandising.

"His first position with the company was that of technical engineer in Sydney, and in 1924 he was appointed assistant general manager for Australia. Success has not spoiled him, and although he is an expert on all matters relating to oil, Kaula is always ready to hear what the other man has to say. The New Zealand manager for the Texas Company is just the type of man New Zealand wants."

It is with regret that I pass along the news of the death of Jesse Fletcher. The following is a clipping from an Indianapolis paper: "Jesse Fletcher, thirty-seven years old, manager of the Hotel Severin and President of the Indianapolis Tent and Awning Company, died at St. Vincent's Hospital, August 11, as the result of an operation for gallstones. In the World War, he made a record of distinction with the 150th Field Artillery, retiring with the rank of captain. His first military service was with Battery A of the old First Indiana Artillery, which he joined in June, 1916, when that unit was sent to the Mexican border. His technical training gained for him an assignment to the signal detail as telephone and telegraph operator. In that campaign he was a private, first class, then corporal.

"In June, 1917, after the entry of the United States into the World War, he was discharged from Battery A to enter the first officers training camp at Fort Benjamin Harrison, and was commissioned a lieutenant from that camp. Then he rejoined the Indiana Artillery, which was enlarged from a battalion to a regiment. When the 150th reached France in the fall of 1917, Fletcher became regimental radio officer. He served in that capacity until the end of the war, and was promoted to captain. After the Armistice he became second battalion adjutant while the 150th was a part of the army of occupation in Germany. He came home with the regiment in May, 1919, and was mustered out as a captain at Camp Taylor, Ky.

"After the war, Mr. Fletcher began a business career and achieved success, rising to the presidency of the Indianapolis Tent and Awning Company and becoming manager of the Severin several years

ago. The survivors are the widow, Mrs. Mary Elizabeth Fletcher, and two daughters, five and three years old."

W. Ames is engaged in the manufacture of high precision instruments. He writes as follows: "Since leaving Technology in 1914, I have been devoting my entire time to the managing of B. C. Ames Company, Waltham, Mass. I am associated in business with my brother, and we are plugging away all the time, trying to make it possible for builders of aeroplanes, automobiles, and machine tools to make their products to closer tolerances, by means of precision micrometer dial gauges and tools. I have not run across any of my old classmates as the duties of the business here keep me pretty well confined.

"On the side, I might say that I shoot golf for a diversion, giving me a chance to get the fresh air and to give vent to my feelings without being censored. I note that you are in the golf ball game, and it seems that I must get in touch with you some way or other and see whether your make of golf balls would improve my driving, mid-shots and putting any better than the well-known and advertised lines of balls on the market."

Jack Freeman has come to the rescue of your humble Secretary with a most interesting account of his doings and traveling since shortly after he left the Institute. "I have been at the Bureau of Standards since August, 1917, in the metallurgical department. During this period of twelve years, however, I have been away on several occasions for several months. In 1921 I was in Europe, six months looking up research in Germany, and worked for some time in the Metallurgical Department of the National Physical Laboratories of England as research exchange worker from the Bureau of Standards. In 1924, I was in Europe again for six months on my own account, and instead of going to school as I had long planned to obtain a Doctor's degree, I believed it much more worth while to travel and visit the larger metallurgical (steel) works of Germany and France. I was fortunate enough to arrange a 'stage,' as the French call it, at the two largest steel works in France, one of which was for ten days at the famous Schneider works at Creusot studying their open hearth practice. In 1926 I was married, as you know, and Mrs. Freeman and I took a wedding trip around the world. We traveled independently from tourist ships, which I highly recommend, and took more time than the average tourist ship. In all, we were gone seven months and visited Egypt, Jerusalem, India, Burma, including a five-day trip up the Irawadi to Mandalay, the Federated Malay States, Java, China, Japan, the Hawaiian Islands, and then home. We have been in Washington since then, and now have two children, a girl and a boy. You will be interested to know, however, that I am leaving the Bureau to become associated the first of the year with the metallurgical department of the American Brass Company. My work at the Bureau has been intensely interesting, and I regret leaving

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many of the problems and associations of the past twelve years. The past three years, I have been trying to help determine the cause of that most baffling and illusive type of rail failure known as a transverse fissure and only recently have been directing the metallurgical phases of the Bureau's study of the Mt. Hope Bridge cable wire failure. You can readily believe, however, that Mrs. Freeman and I are happy to be getting back to New England nearer Providence, the Freeman stronghold, and Wellesley, my wife's home."

I wish to appeal again to the members of the Class to write me about their doings, for although the information may seem commonplace to the sender, it is real news to the rest of us. It is only in this way that the Class can be kept together, and it is going to make our next reunion ever so much more enjoyable. Please don't delay. — HENRY B. SHEPARD, Secretary, 269 Highland Street, West Newton, Mass. CHARLES W. LOOMIS, Assistant Secretary, 7338 Woodward Avenue, Detroit, Mich.

1917

"I'll tell you what I will do; I'll give you \$100,000." So far as we are aware, Stanley W. Hyde is the only '17 man to have such a gift offered him, in all seriousness, by a man with the money — in this instance, Cyrus H. K. Curtis, the noted publisher.

Stan Hyde is the principal of the North Yarmouth Academy at North Yarmouth, Maine. To quote the *Portland Press Herald*: "North Yarmouth Academy has made remarkable strides since the election of Mr. Hyde as principal three years ago, and is now functioning to the limit of its capacity. Over a year ago, Mr. Hyde and the trustees mapped out a program of extension which called for the raising of \$150,000 in five years; \$100,000 to be devoted to new buildings and \$50,000 to be set aside as an endowment fund. The magnificent gift of Mr. Curtis assures the Academy of the much needed buildings, and the trustees feel confident that the remaining \$50,000 will be forthcoming from loyal graduates and friends of the school."

We understand that Mr. Curtis's interest in the Academy was developed by Stan and that the expansion program includes the erection of a group of three buildings designed by Lester Beal of the Class of '18.

Nig Sewall is in Chicago with MacDonald Brothers, industrial auditors and engineers. He is in charge of their work for a large corporation with plants all over the country and expects to continue his heavy travel program. He has three crews of engineers working for him. Seattle, Baltimore, Jersey City and other cities, which are not specified on the list given us, are on the list of locations.

Where are Ed Twomey, Sherry O'Brien, and Dean Parker? Their mail has been returned from their last known address. — RAYMOND S. STEVENS, Secretary, 30 Charles River Road, Cambridge, Mass.

1918

As decisively as a man would remove a strand of spilled spaghetti from a dress shirt front, the Review Editors remove all my attempts to get verse included in this column, so please don't send in any more contributions about vectors pointing, cones revolving, osculating balls in space, differential cubes resolving into screws of time and place.

Marvin Pierce, now has the right idea. His academic career was marked by calculations of reservoir capacities and contour mapping. Now he is assistant to the President of *McCall's Magazine* (a woman's magazine, isn't it?). After all, applesauce is thicker than water. Well, Marvin, the old peach, says: "We pay for manuscripts in this shop and don't write them. Hence I am afraid that you may break your unbreakable rule and reject this one. I believe our mutual friend, Eric Hodgins '22, and I are the only Technology graduates who ever left the engineering profession for a woman's magazine and the dress pattern business. I don't know about Hodgins, but in my case I did it, like the infamous Joe Jackson, 'for the sake of the wife and kiddies.' (There are three of them. I mean kiddies.)"

"Despite the fact that necessity drove me from my chosen course, I am enjoying my work immensely and find that time spent at Technology becomes of assistance in the most unexpected ways. My only regrets arise when I pass a hole in the ground full of steam shovels, or even a good-sized concrete mixer. I see Bill Wyrer occasionally and have just received a communication from him, stating that he has been elected Secretary and Treasurer of the Missouri Pacific Railroad Company. He also tells me that he not only is a director of that road, but also of seventeen other affiliated railroads — all of which impresses me greatly until I remember how able a fellow Bill is." Please don't reject this, but I won't mind all the editing necessary to cut it down to three lines.

With a politeness not born of the volcanic vocabulary of the mining assay laboratory, Pete Sanger dropped a blanket note to the Boston crowd inviting those in New York for the Power Show to attend the Father Knickerbocker '18 luncheon at Enrico's on December 2.

Speaking of academic careers, in November the Boston *Sunday Post* devoted a whole half page to Benny Whorf. After the reeking fabric of Benny's clothes had been cleansed of the last whiff of chemistry laboratories he went into the insurance business without benefit of Listerine. In time, the "P" Benny drew in freshman German got on his subconscious medulla oblongata, so he took up ancient Hebrew and the language of the Mexican Aztecs. Result: Benny gets a two years leave of absence from Hartford to go to Mexico and put the scribbling on some of those old stones Lindy couldn't read from his plane, into their ancient equivalents. If he finds that any of those old grizzle

faces are now in need of fire insurance, we hope that he'll arrange some way to write the policy.

Here comes the inevitable announcement of what happens when the immovable man meets the irresistible girl. We haven't missed getting one into every number. On September 15, the engagement of Granville B. Smith to Miss Elizabeth R. von Gontard, was made known through the columns of the *New York World*.

The Secretary's new book is able to sit up and take nourishment, thank you. (Collaborator none other than the talented Eric Hodgins '22.) At this writing it looks as though a third printing will be necessary before Christmas, even though the first edition of 5,000 copies didn't go on sale until November 18. Also we got selected as the November offering of one of the book of the month clubs and there are nibbles for an English edition. (Maybe Benny will translate it into Aztec.) So we don't care a bucket of entropy how unkindly The Review reviewer treats us. It's a wow of a success, and we laid another keel last week. If the classmates to whom I have sent a free copy and from whom no acknowledgment has come, didn't receive theirs, please let me know. — F. ALEXANDER MAGOUN, Secretary, Room 5-328, M. I. T., Cambridge, Mass. GRETCHEN A. PALMER, Assistant Secretary, 51 Houston Avenue, Milton, Mass.

1919

We have a number of weddings to announce. Miss Marie E. Holm of Woodhaven, L. I., was married to John E. Cassidy of Boston in August in St. Thomas's Church, Woodhaven. Mr. Cassidy and his bride sailed for Buenos Aires where he is to be engaged in the construction of a power plant. — The marriage of Miss Eleanor Frances Clark of West Haven, Conn., to Wirt Fuller Kimball of Brookline was solemnized on September 15 at the home of the bride's parents. An informal reception followed the wedding after which Mr. and Mrs. Kimball left on an unannounced trip, after which they will be at home in New York. — We have also to announce the marriage of Miss Ruth Susan Pertsch of New York City to Ralph H. Gilbert at the Little Church Around the Corner on July 6. Mr. and Mrs. Gilbert took a trip up through northern Ontario nearly as far as the Hudson Bay and are now living in New York City. — Announcement is made of the marriage of Miss Hazel Sandsbury of Boston to Carlos Krebs. The ceremony was performed on October 13 in the Church of the Advent, Boston.

A number of our classmates have changed their business relations in the last few months. Leo Kelly is now connected with the International Telephone and Telegraph Company in New York City. George Fleming is now located in Detroit, still with the United States Rubber Company. Paul Swasey is employed by Stone and Webster Company in Boston. Gene Smoley has recently gone with the Standard Oil Development Company of New York City. He is

1919 Continued

located at the present at their plant in Bayway, N. J. Ervin Kenison has recently started work at the Bell Laboratories.

On Tuesday, November 19, the men in New York district had a get-together at the Technology Club. The following were present: Lloyd, Rogers, Gilbert, Rasmussen, Blake, Kelly, Rhodes, Patterson, Given, Way, Smoley, Shea, and Langille. The gathering occurred in the main dining room where a special table was set. After dinner everyone adjourned to the club rooms and spent the balance of the evening socially. We were particularly pleased to welcome some new members to this dinner. Blake, who is now located with the Bell Laboratories, was able to come for the first time. Gene Smoley, who has just completed some graduate studies at the Institute and has been away for a number of years, was also able to be back again. Shea, who is also with the Bell Laboratories and who has been for some time in the past commuting to the Institute for some special work, was also able to be with us for the first time. We missed, however, George Fleming, who was a steady attendant in the past.

We had promised to give you some further information concerning the Class Reunion last June. It will probably be of interest to note the lines of work in which the fifty-two men at the Reunion have been engaged. Manufacturing claims the greatest number, that is eleven. Second in the list stands construction, numbereight. Telephone work also seems to be popular, and here we find six. In sales engineering work there are three. There are some moneyed men in the Class also and we find three engaged in banking and investments. Two are engaged in the cotton and wool business, and two in building supplies. Public health has not been neglected, and we find here one. One also is engaged in metallurgical work. A Course VI man is employed as a town engineer. Fire protection also employs one man. One wise man has selected life insurance and yet another, also wise, has gone into the retail furniture business. Yet another is engaged in wholesale dairy business and, in keeping with the times, one is also employed as an aeronautical engineer. The arts have not been neglected and we find one architect. Practically every Course was well represented at the Reunion, Courses VI and XV having by far the greatest numbers. Attendance at the Reunion came principally from Massachusetts, with New York and New Jersey second in number. Representatives were there from Wisconsin, Connecticut, Maryland, and Minnesota. — W. C. LANGILLE, *Secretary*, 144 Acme Street, Elizabeth, N. J.

1920

Just as these notes go to press I am in receipt of a highly important and interesting communication from Norrie Abbott announcing the appointment of the Grand Committee on Ways and Means for the Tenth Reunion of the Class. Here is your committee: Bud Cofren, Chairman, Norrie Abbott, Perk Bugbee, Buzz Bur-

roughs, Ted Hobson, Johnnie Nash, Ed Ryer, Phil Somerby, Scottie Wells, and Harold Bugbee.

Let me spread upon this record the first proclamation anent the Tremendous Tenth. Hear ye! Whereas and to wit next June marks the tenth anniversary of the graduation of Technology's greatest class. Now, whereas, this fact may cause amazement even consternation at the rapid passage of time and the advancement of our estate, let us not be dismayed or downhearted, even though a glance in the mirror reveals a sagging of the jowls or a rapid though orderly retreat of the once bushy forelock. Rather, let us rejoice that we survive to witness the celebration of this glorious event. Your committee pledges earnest and active effort but must have your whole-hearted coöperation, and it is not too soon to make definite plans to be on deck next June. The fact that there is to be an All-Technology Reunion and a Boston Tercenary celebration at the same time merely emphasizes the importance of our Reunion, since both of these events are admittedly basing their hope of success on this major event of ours.

Your Secretary had the good fortune to run into Scottie Wells on the street the other day and enjoy a bit of gossip, learning thereby that Walt Sherbrooke is now in Boston and is working for the Grinnell Company of Providence; that Jack Kellar is President and Treasurer of the Kellar Woodworking Company of this vicinity; and that Bud Cofren is now in Boston with the National Cash Register Company. This rumor that Bud is in Boston should have confirmation in the form of a phone call or visit to the Secretary, but this, as yet, has not been forthcoming. If I have not already told you, Buzz Burroughs is now actually married and resides in Scarsdale. We announced Buzz's engagement in a previous issue, but do not believe we have thus formally announced his marriage and thus equally formally offered him our sincerest congratulations. Scottie himself is still a captain of the curbstone industry, and we do not mean by this that he sits on the curb or that he belongs to the New York Curb, but that he actually sells curbstones.

A note from Benjamin West brings the news that he is now with the New England Power Construction Company here in Boston and is writing on the side for the *Engineering Magazine* of England.

I am pleased to announce that my helpful and valued contemporary, Hank Pierce, has won a well deserved distinction as President of the Pierce and Barnes Company of this city. Hank passes the word that Larry Burnham is now a big shot with the Hood Rubber Company, and Medwin Mathews is an engineer with the New York City Water Supply System.

Your Secretary is happy to contribute a small item of news regarding himself; namely, that his son, Holbrook, arrived on September 27, which, with his daughter Barbara, four years old, is regarded by

him as a model family for the Class. — HAROLD BUGBEE, *Secretary*, 9 Chandler Road, West Medford, Mass.

1921

He who is headlined on the front page of tonight's star final as the "Snob Savant" is quoted as having told a Boston audience that playing bridge is the "lowest depth to which a human being can fall." This world famous man captured some additional column inches a little further along in the same edition with an announcement of his debate with a Brooklyn editor on the subject, "Resolved, That Being a Snob Is Advantageous." We searched the rest of the paper in vain for his endorsement of some manufacturer's product as, for instance, "Be a Snob, light a Corona Corona." All of which is merely by way of suggesting that you dust off those New Year resolutions, stop the bridge game, and be a snob — at least long enough to let your Secretaries know what has happened to you and why.

D. C. Jackson, Jr., VI-A, is the first speaker on this month's program. Dougie who is Senior Professor in the Department of Electrical and Mechanical Engineering, Speed Scientific School, University of Louisville, Louisville, Ky., can neglect our request above in view of the newsy document just received from him. He says, "I was glad to get real news of Gillie Gilbert's marriage; it had been rumored for months and I had begun to think it was a smoke screen. Did I write you that on June 28 last a third son arrived, Daniel Wyer Jackson? We now have four children, Dugald 3d, ten years old, David, seven, Elisabeth 2d, two years, and Daniel, five months.

"I went to the A. I. E. E. Convention in Swampscott and saw a number of old friends. Cookie Cake VI-A was on from Oregon with his wife. He is chairman of the Portland section of the A. I. E. E. Paul Rutherford VI-A brought his family from Dayton, Ohio. Herbie Nock VI-A showed up for a while, but left his family at home. Some of the VI-A men in '22 were around, but I won't lower the tone of this letter by naming them. (Lay off '22, Doug. Your shot last year was too much for them. Send that list of names and we will return Eric's compliment and publish it.)

"I spent August and September at the Hawthorne Works of the Western Electric Company on mighty interesting work. While in Chicago I consorted with several Technology men, R. H. Frazier, VI, now on the department staff at the Institute; Pete Rumsey, sometime assistant in the Electrical Department at Technology; C. T. Prendergast '28, member of the first class in the American Tel. and Tel. Company option of VI-A; and several of the students in coöperative work with Western Electric. I also had dinner with the Jimmy Janes VI — in fact I helped them celebrate their wedding anniversary. Ask Jimmy about that — or no, ask Lucy Janes. They have a fine auburn haired son, Bob. Jimmy Coleman '23, once laboratory assistant in the

1921 Continued

Dynamo Laboratory, also helped to celebrate the wedding anniversary. Janes is with the Public Service Company of Northern Illinois and seems to be doing right well. He came down to French Lick, Ind., during the last of September for a convention and said he would visit us in Louisville, but when the time came he couldn't seem to get across the Ohio River. We have now opened the new Municipal Highway Bridge for his benefit and for all others of the Class who will be rushing south for the winter. I don't have a bid for fame such as Randall's new suit of clothes, but I bought a home movie outfit and am becoming quite a fan." Doug then has the effrontery to offer to give us a screen test; come up to our new sound picture laboratory and we'll show you how the Voice of Action does it. He doesn't go into detail regarding his share in the preparation of "The Profession of Engineering" published by Wiley nor his part in sending a number of his graduates to Technology for advanced degrees. Congratulations and best wishes from all of us, old man.

News has just come to us of the marriage last April in Rome, Ga., of Miss Laura Weller Graham and Harold Frier-son Hunter II of Greensboro, N. C. Hal and his bride are residing in Rome, Ga., where our congratulations are directed.

From the Lynn, Mass., *Item* of October 5, comes the following: "Mr. and Mrs. Herbert Henry Holton are giving an informal tea at their home in Swampscott on Sunday afternoon to announce the engagement of their daughter, Eleanor, to Dr. Reginald Smithwick III, son of Dr. and Mrs. Marsena Smithwick of Brookline." After our graduation Reg attended the Harvard Medical School from which he was graduated in 1925. Since then he has been connected with the Massachusetts General Hospital. If we ever succeed in getting a written line from '21's busy representative on the Alumni Council, we will present a short story entitled, "From Miner to Medico." Here's how, Reg.

The Class of '21 is well represented in the recently published pamphlet listing the officers and committees of the Alumni Association. Besides Reg Smithwick as class representative and your correspondents as secretaries there appears the name of G. A. Chutter VI-A, who is representative-at-large until 1930; Manuel S. Vallarta XIV, VIII, representative on the Council of the Technology Club of Mexico; R. W. Smith XII, Secretary of the Atlanta Association of the M. I. T.; G. F. Gokey XV, Secretary of the Detroit Technology Association; H. P. Field VI, Secretary-Treasurer of the Technology Club of Hawaii; and E. F. Praetz II, President of the Technology Club of the Merrimack Valley.

We recently lunched with R. R. Whitehouse XIV and visited his new quarters in the International Tel. and Tel. Building at 67 Broad Street, New York. Bob is transmission engineer for the Postal Telegraph and Cable Company. We left him still in doubt as to whether a notice from the Technology Club of New York

announcing a meeting of "M. I. T. Alumnae" was intended for him. During a convention in Memphis, Tenn., your Asec looked up A. J. LaPointe X, who was with the Buckeye Cotton Oil Company there, but Doc could not be located. Where are you, Doc?

E. R. Chilcott VI-A is attaining considerable prominence amongst the Hollywood movie folk according to the reports of our boss, F. L. Hunt '09 and our ex-boss, J. P. Maxfield '10, who say he is one of the shining lights in the recording engineering department of the Hollywood division of Electrical Research Products, Inc.

T. B. Card VI is at the Harvard University Graduate School of Business Administration. D. H. Hatheway VI is in the generating department of the Edison Electric Illuminating Company of Boston, and is located at 39 Boylston Street. T. D. Dutton VI is with the American Tel. and Tel. Company, and is located in the Bourse Building, Philadelphia. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, South Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Bell Telephone Laboratories, Inc., 463 West Street, New York, N. Y.

1922

A short time ago Heine wrote saying that he had returned to the civilized world, in fact is to be found at 942 Broad Street, Newark, N. J. Do you suppose that he will put Newark on the map? He said that Eric Hodgins had not been found but he hoped he would locate him shortly in a little town on Manhattan Island. (The Technology Review tells us that he is at 211 East 35th Street. Please note, Heine.) Heine went on to say that he was appointing me as official custodian of the troubles of our Class. Right now it is impossible for me to say definitely that I can be a second Atlas, but at least will present a few notes received from The Review Office. Tell us all about your doings and we will make The Review next month a bigger and a better issue.

From the Oranges in Jersey comes word that Mary Lucey, daughter of Mr. and Mrs. Dennis Benedict Lucey of Ogdensburg, has married William J. Grady. They will reside at 376 Prospect Street, East Orange. Bill is Vice-President of the R. A. Fife Corporation of Mamaroneck, N. Y.

Announcement was made early in September of the engagement of Miss Sally Crawford of Westport to Charles W. Maschal. He is said to have traveled all over the world for the Standard Oil Company and to be at present with the Norwalk Branch. — Late in August the engagement was announced in Worcester of Chrystella A. Swift to Webster K. Ramsey. Webster is an executive of the United States Envelope Company in Springfield. Apparently he is following Professor Rogers's advice. — In North Andover Miriam F. Campbell became the bride of Charles Mason Tucker. Their home will be in Andover.

And that is all. So before you drop this copy of The Review, take your pen in hand and give us a few tidbits for future use. — RAYMOND C. RUNDLETT, *Secretary*, Daniel Low & Company, Salem, Mass.

1923

The call for notes for the January Review finds the Gensec's file as empty as usual. However, thanks to the society columns of the daily newspapers we are able to gather some meager information regarding those of our classmates who have plunged into the sea of matrimony. First let me correct a statement in the December Review. Bob and Mrs. Shaw are now making their home at 622 Pelhamdale Avenue, Pelham Manor, N. Y., not in New Jersey. Bob is now with the General Electric Company located in New York City.

We understand that Ernest Pratt was married last September to Miss Gladys M. Squires of St. John's, Newfoundland. Pratt is working for the Boston Elevated Railway Company in the Engineering Department. — Fred Klutey was also married the latter part of the summer. Fred married Miss Cornelia A. Chichester and is now living in Wilmington, Del., where he is connected with the duPont Company. — Hugh Spencer has left his old job and is now associated with the New England Power Association in Boston. Further details, however, are lacking.

Then it is about time we chronicled the fact that Hugh Ferguson, who has been associated with the Dewey and Almy Chemical Company in Cambridge for some time, has been promoted to general manager. — I met Freddie Brittain on the train a short time ago and discovered that he is a neighbor of mine, having just built a house not far from my own in Braintree. — It is queer how our classmates amble around this terrestrial globe, leaving no tracks behind them. I just received a list of names for correction of the "Register of Former Students." A number of business addresses I know have changed, but the correct ones are hard to find. I would appreciate any help the Class can give me in bringing our section of this "Register" up to date. — ROBERT E. HENDRIE, *General Secretary*, 91 Walnut Street, Braintree, Mass. HORATIO L. BOND, *Assistant Secretary*, 37 Concord Avenue, Cambridge, Mass.

1924

We so rarely talk about money in these columns that when we do we ought to give it first place. The Class needs money to be able to exist for a few years more. To the mailing list a request for \$3.00 was sent out. This is to remind you to send in your check to Bill Correale at 840 Matt Avenue, New York, N. Y. The purpose of the money is to be able to assist the Alumni Council on Athletics and incidentally to support your Gensec and the other officers in the manner to which they are accustomed. So please help fill our community chest quota.

Bill Correale tells me that '24, in conjunction with '23 and '25, is going to run a dance in New York City on January 18.

1924 Continued

The dance is being run by the New York bunch but, unfortunately, Bill didn't tell me just where. Everybody come just the same.

Technology families are growing. Additions are reported to the families of Bill Correale, Frank Manley, and Johnny McCoy. Greg Shea is now with the National City Company.

The weddings to be announced are: George Washington Elkins, 2d to Miss Helen Douglass Gardner, a graduate of Radcliffe; Stanley Turner to Miss Elizabeth Marion Smalley of Dover, N. H. I also hear that Ted Simonton and Tom O'Brien are married, but I'm sorry to say I have no further details.

And then there are some engagements, too: Miss Mary K. Murray to Roger L. Griffin; Miss Ruth M. Standley, a graduate of Burdette, to Robert W. Hart; Miss Virginia Bernard Graves of Richmond, Va., to Miles Cary.

Has anybody seen or else heard of the whereabouts of one reel of moving pictures taken during Senior Week, 1924? We are very anxious to locate it and, very unfortunately, it has disappeared. Please let us know if you have any clues. — HAROLD G. DONOVAN, *General Secretary*, 139 Girard Avenue, Hartford, Conn.

1925

In a letter to Professor Spofford, Fred Sommer III reports that he has been appointed American Trade Commissioner to Riga, covering the Baltic republics of Esthonia, Latvia, and Lithuania. He wrote: "There are great engineering possibilities in all these countries, the oil shale fields in Esthonia, the harbor repair work along the Baltic, railroad construction, housing, town planning, and so on, as well as the sale of American automobiles, agricultural and industrial machinery, in spite of the fact that Germany is so near."

"I expect to have to spend some time learning Russian, as Russian and German are the commercial languages. Things will keep me busy for the first nine months as the commercial attaché is returning to the States, leaving me in charge of the office with only local help to work with; all of which will be exceedingly interesting." Fred was expecting to sail last spring, so perhaps we shall have some more news from him.

Alfred Franks X was married to Miss Florence Silverman of Cambridge, Mass., on August 21. The couple will make their home at 319 St. Paul Street, Brookline, Mass. — Norman Mansfield VI and Miss Phoebe Lamont were married October 10. Miss Lamont, a Wellesley graduate, is a member of the Junior League of Newark, N. J.

I received a card from Freda and Harrison Browning II to announce the birth of Bubbles Joan on November 13. — Carroll J. Webster is also a proud father since the birth of Floyd William last May. Webster is a civil engineer with the Santa Fé Railroad in San Diego, Calif.

Roger W. Parkinson has been transferred from the 602nd C. A. to the 909th, an anti-aircraft regiment. Parky is now

my special correspondent for New York City and vicinity; any of you who have any news can get in touch with him at the American Sugar Refining Company, 49 South Second Street, Brooklyn, N. Y.

The engagement of Horace Bush to Miss Jane Mathewson was announced on October 7. Miss Mathewson is a graduate of the Mary C. Wheeler School at Providence, and is now studying at Rollins College, Winter Park, Fla. Horace is working for Worthen and Company, investment brokers, in Boston. — Joseph Hautman and Miss Isabella Marie Johnson were married in Cincinnati, Ohio, on September 11.

James A. Westhaver is now holding the position of chief chemist for the Cambridge Smelting Company. He and Miss Marion Ethel Ober were married on August 24, in Malden, Mass. After a honeymoon spent in New York and Pennsylvania they will be at home at 272 Washington Street, Malden, Mass. — FRANK W. PRESTON, *General Secretary*, West Virginia Pulp and Paper Company, Piedmont, W. Va.

COURSE II

Our correspondent this month is Roger Ward; in fact I think that Roger wrote just so that we would not feel too badly over his disappearance from the draughty atmosphere of Buffalo. But you can imagine seclusion in Hatboro. I don't even suspect what street Hatboro is on, but anyway it is somewhere in Pennsylvania. Roger relates that "I wondered if I wouldn't rather cease wandering around in the engineering field and get on the other side of the fence. For a little more than a month now, I have been with Pitcairn Aircraft, Inc., as production manager. Hatboro is about fifteen miles from Phillie and although I don't want to hurt the feelings of any native Buffalonians, I no longer have to worry about the ice going out of the lake in May."

And so sufficient for another month. Oh no, the undersigned is now with the Boston Manufacturers Mutual Fire Insurance Company, and will always be glad to have any of the fellows drop in anytime. Seasons greetings to all. — NELSON D. MALONE, *Secretary*, 185 Franklin Street, Boston, Mass.

COURSES III AND XII

It is very fortunate that we have Count Blonsky to provide some news for the miners, otherwise, our column would be missing more often than it is. Blonsky, who is still with the Dorr Company, dropped in at the Institute for a few hours, recently, after quite a tour through the principal mining districts of Arizona, Utah, and Montana. He sailed on the *Homeric* for London on November 8. Just what his ultimate destination will be is in question and may be anywhere in Europe, Asia, or Africa.

J. J. Buerger, whom most of you know by now, received his Doctorate last June and has been appointed Assistant Professor in the Department of Geology, spent most of last summer in Newfoundland battling black flies and mosquitoes

as he mapped the geology of the country. Word has recently been received that A. L. Sherman is now located at Havana, Cuba, with the Ingersoll Rand Company.

Your Secretary had a very enjoyable time during the last summer. During June and July he traveled in eastern Canada from Montreal to Sydney, N. S. All this time he was the guest of the Radiore Company of Canada, Ltd., and was given every opportunity possible to study the electrical prospecting method used by them under various conditions. August and September, as usual, were spent at Dover where the largest group since our own summer of 1924 tried to prove that the surveys of previous years were in error. — F. L. FOSTER, *Secretary*, Room 8-219, M. I. T., Cambridge, Mass.

1926

The crash of the shock market, as some wag has called it, is reflected in Class Note output. Not a single marriage, birth, or engagement has been reported during the last month. It is indeed a tight market.

R. Cutts, Jr. '27 has sent in a clipping describing Nat Gada's recent excursion into the realm of aesthetic theory. The information as it comes to us reads as follows: "N. Gada, lighting specialist, Chicago office, gave an address on 'Beautifying Rock Island' before the Associated Civic League Clubs at Rock Island on August 22. This League is made up of the chairmen and committee members of all the women's organizations of the Tri-Cities. Mr. Gada gave an interesting talk on electric fountains for beautifying cities." We are not quite sure what electric fountains are, but if they are anything like the fountains of perfume that are annually operated in Mechanics Hall during a policeman's ball, then I am sure they would appeal to the women's organizations to whom Nat spoke.

Rockwell Smith, eschewing the delights of American life, has joined the engineering force of Hugh L. Cooper and Company and gone to Russia. His address reads as follows: American Consultation, Dneprostroy, Kichkas, Ukraine, U. S. S. R. He is working on the Dniepir River power development.

Bill Lowell is now in the engineering department of the High Grade Lamp Company at Salem, Mass. He still lives in Newburyport. — Bill Millar contributes below a continuation of his account of engineering in darkest Africa, he too, having eschewed his native country. — J. R. KILLIAN, JR., *General Secretary*, Room 11-203, M. I. T., Cambridge, Mass.

COURSE VII

I have been asked to insert some information in The Technology Review by "hook or crook" concerning your activities and whereabouts. Not believing myself to be a crook and having no hook, it will be necessary for me to leave out many important and interesting facts of your past year's evolution. Please send in a word, if no more than your address, as soon as possible, so that the next issue may be of interest to your many friends.

1926 Continued

Having no news from the rest of my course members, it is up to me to supply some about myself, which I feel is in order. This November 19 Miss Martha Elizabeth Fish of Canton, Mass., and I announced our engagement, thus making fifty per cent of our Course married, twenty-five per cent engaged, and twenty-five per cent unaccounted for. You may be further interested to know that the task that four years ago loomed up as such a stupendous one is nearing an end, for in June of this year medical school ceases while an internship will take its place. — E. M. HOLMES, *Secretary*, 22 Bates Road, Watertown, Mass.

COURSE XII

I see by the papers that the Northern Rhodesia copper belt is at length getting before the public and, speaking as a pioneer (fourteen months residence!), I am glad this is so. There is much that is worth talking about. Take "sundowners" for example. There's a fine institution for you! Quinine, you remember, must be taken regularly to keep all the little anopheles in a state of constant discouragement. With this praiseworthy object in view we gather at someone's house in the early evening and with serious mien partake the prescribed fine grains. Then, the work of the day presumably completed, we settle world problems, army problems, with the beneficent and perchance stimulating aid of Herr Pilsener; the Hon. Gordon with lemon and a dash of Angostura; or Sir John's amberproduct. . . . But enough, enough, I can hear the parched tongues of '26 clacking and clattering.

Getting back to the copper business and work, my present activities center about being resident geologist for Mufulvia Mine, a property which has an enormous tonnage outlined by drilling and which is now being pushed towards the producing stage. Among other duties I have to play nurse to all the core from the drills which entails acting as core guide to the numerous visitors at the property. There is a certain amount of hardship in connection with being guide. During the recent International Geological Congress in South Africa, a party of about thirty came to Mufulvia, and among them was a small and agile fellow suffering from a well-advanced case of mineral collector's mania. Only the most strenuous exercise and a bellicose "no" every minute or so prevented Mufulvia from being transported *in toto* to a certain European country. The next day I joined the Congressites on their trip through the mines of the Katanga and spent a very pleasant and profitable week studying Congo geology — at least the part of it that is open for inspection. The radium mine and Chinkobowe remains a mystery (more or less), as absolutely no one can get a permit to visit there. For those interested it may be said that radium production there could be greatly increased with undoubted benefit to humanity but, with a corresponding shrinkage in the price of the commodity, I suspect that the present small production will not be altered.

The Congo trip was not without amusing incidents, perhaps the most enjoyable to me being the night of my aforementioned mineral collector forlornly wandering around a three-ton chunk of native copper trying to find a removable portion. This failing, but being, as I say, a man of great singleness of purpose, he later on carried off, or rather dragged off, a square yard of malachite four or five inches thick taken from a very wonderful malachite cave which had just been opened up by a steam shovel. In justice I may say that I would have taken away a similar piece, but lacked his physical fitness induced by a full month of carrying around great globs of everything from the South African Bushveld Complex to the Katanga Tillite. — WILLIAM B. MILLAR, *Secretary*, c/o Rhodesian Selection Trust, Ltd., Ndola, North Rhodesia, Africa.

1927

Another one of our Course Secretaries has fallen by the wayside. Our only information is a clipping from the Boston *Advertiser* of August 11, which says that Miss Anne M. Houston of Jamaica Plain and Charles A. Bartlett of Stockbridge are soon to be married. The clipping even goes so far as to say that "Yesterday the groom-to-be filed intentions at Portland, Maine. . . . The wedding will take place within a fortnight." A hasty mental check upon the course secretary roster seems to show that there are only a few of us bachelors left. Oh, well!

This brief note is a plea for all members of the Class to cooperate with us by sending in news about themselves and their activities. The only bit that has reached us this month was a clipping which announced the engagement of Tom Knowles. This we appended to Dave Knox's Course II Notes. The burden of the section this month is thus borne by the representatives of Course II and Course V. A happy New Year to all! — JOHN D. CRAWFORD, *General Secretary*, 7 Goodwin Place, Boston, Mass.

COURSE II

January is the open season for good resolutions, and it would not be out of place for many of you to write me regarding your present location and field of endeavor. I am sure a great many of the boys would like to hear what the rest of us are doing. — Bud Gillies has been rewarded with the handsome title of Vice-President in charge of engineering by the Grover Loening Company, Inc., in New York. He writes that he was engineering assistant to Mr. Loening last winter doing consulting aeronautical engineering work. When the new company was formed in the spring, Bud was assigned to the above-mentioned position. He also has the job of test pilot.

Jerry Yudkin recently sent me an announcement of his marriage to Miss Ida N. Levine in New Haven, Conn., on September 22. Jerry is at present connected with the Fidelity Investment Association, "whose main business is building incomes." Jerry must have

taken Professor Tucker seriously. His address is 297 Wakelee Avenue, Ansonia, Conn.

From an undated clipping in the Akron, Ohio, *Beacon-Journal* we reprint the following, extending, meanwhile, our best wishes: "Of especial interest to members of the younger set is the announcement of the engagement of Miss Marian McTammany, daughter of Mr. and Mrs. Robert McTammany, 230 Casterton Avenue, and Thomas A. Knowles. Miss McTammany attended Glen Eden School, Stamford, Conn., and is well known in debutante circles. Mr. Knowles is a graduate of Technology and is connected with the Goodyear-Zeppelin Corporation in this city. No wedding plans have been disclosed."

My work at the present time keeps me confined to the office in Detroit most of the time, so that your letters should receive prompt attention. Here's best wishes to you all for a happy and prosperous New Year. — DAVID R. KNOX, *Secretary*, 13505 LaSalle Boulevard, Detroit, Mich.

COURSE V

The notes this month are devoted to the two who were not even mentioned last month, namely Jim Castner and Ralph Peterson. They are both with E. I. duPont de Nemours and Company, and are at Gibbstown, N. J., in what is known as the Eastern Laboratory. A picture of the duPont plant in this locality including the Eastern Laboratory is shown in the November issue of the *DuPont Magazine*. Ken Vint was with Jim and Pete for some time before he was transferred to the Louviers, Colo., plant of the duPont Company. Jim's duties have increased and, at the present time, three recent graduates are in his charge. Pete is becoming a specialist in one of the important lines of endeavor of the company. In this connection, he was sent to Birmingham, Ala., for six months to install and to train operators for a new process in a branch plant. Neither man is married as yet. They probably took the advice that Tubby Rogers gave at our Senior Banquet. The occasion for these items is a very pleasant Sunday afternoon visit on their part to Wilmington and on my part to Woodbury.

Stuart Bugbee has resigned from the Continental Fiber Company and is now in Charlestown, W. Va., at the plant of the duPont Ammonia Corporation. — EDWARD T. DUNN, *Secretary*, 2014 Baynard Boulevard, Wilmington, Del.

1928

In *Time*, issue of October 7, there appeared the account of the blind flying by Lt. James H. Doolittle, S.M. '24. Tucked in the middle of a paragraph is the news that one Lt. Benjamin Kelsey went along: "Lt. Kelsey with his arms resting on the gunwales." Kelsey was there in case of an emergency. Lt. Doolittle's feat of taking off, flying a specified course, and landing entirely by instruments is regarded as one of the greatest ever made in aviation. In

1928 Continued

this flight Ben acted the part of the "safety man." We are proud to know that the flight was accomplished by a Technology man, but even prouder to learn that a '28 man assisted in making it possible.

Graduates of Course VI-A will be pleased to learn of the marriage of Miss Vivian Ingram to Carroll C. Smith, better known as Smitty. The ceremony took place on September 1 at Lida's Wood, the dormitory of Eureka College at Eureka, Ill. The young couple are now living in Detroit, Mich., where Smitty is working with the Detroit Edison Company. — Announcement was made on October 28 of the engagement of Miss Elizabeth R. McKinney to Gilbert Smiley of Course VI. Congratulations, Gil! — Two other announcements foretell that the Benedick sections of Courses II and XV are soon to be strengthened. Miss Janet E. Wolkins is engaged to Adolph F. C. Maertins, Jr., of Course II, and Miss Janet Goodwin is engaged to George S. Hubbard of Course XV.

The Sears Roebuck section of Course XV has been split up, and we have heard that Bunny Burnell and Bud Grey have been transferred to the Newark store. Bud is the new merchandise manager for the Newark unit. Great news, Bud!

When you see pictures of the new Zeppelins and hangar being constructed by the Goodyear-Zeppelin Corporation out in Akron, remember that Bus Roch of Course XV is now busily engaged in efficiency work connected with the construction of these new giants of the air.

Joe Parks of Course II is now back at the plant of the E. L. Patch Company, manufacturing chemists of Stoneham, Mass., after an extended sales contacting throughout the eastern part of the country. Joe is still following his hobby of football and is playing with and coaching a local team in Stoneham. Joe also has another exciting (?) hobby. If you see Joe, ask him about a certain horse called "Wild Betty." — GEORGE I. CHATFIELD, General Secretary, Room 11-203, M. I. T., Cambridge, Mass.

COURSE I

After Ken Clark had spent a little more than a year with the Chicago Sanitary District, things began to happen to him. Here is the story from a letter written late in September: "I must have walked under a ladder after I wrote you last. When I was at army camp the Sanitary District gasped its last on construction work and the inevitable result was my release. I was lucky, though, in being placed right away with the Portland Cement Association. This job seemed good and prospects were good. Note the past tense. Just three weeks after going with them the finances of the Association took a turn for the worse, and the last man in each department is to leave October 1. The Denver office is shut down completely and a general retrenchment has been adopted. There is a possibility of getting back here January 1, and instead of taking a temporary job in Chicago while waiting, I am going home to Bos-

ton and get something temporary there, at least I hope I will!" Ken did get that Boston job, with a private engineer, Mark Linenthal. The work is steel and concrete design. Incidentally George Bernat IV had been in this office until a short time ago. Ken wants to get back to Chicago, and the first of the year will probably find him making another change.

Harold Porter is now working in New York, and he, George Mangurian and I are acquiring quite a reputation for visiting *en masse*. One week-end we spent very enjoyably with Morrill and Duncan, Jr., who is now about fifteen months old and is taking after his Dad. Morrill is still with the Telephone Company. His jobs are of a rather varied character, partially in the office and partially outside where he has the chance to run around inspecting pole lines in a company car.

On another evening our trio visited Mike Cohen XI and his better half. As Mike is Secretary for Course XI we won't try to steal any of his thunder. With only four in his Course his sources of material are already very limited. Still another Sunday Hal, George and I spent with Ventura. When Greg left Boston he came to New York and took his degree at New York University. He then went to work for Gibson-Hill, the consulting engineers for the Pennsylvania Railroad. After several months on that job he switched to the Otis Elevator Company for some time, and then only last week made another change, this time to the Western Electric Company in Kearny, N. J. When Porter came to New York he promptly followed in Ventura's footsteps. For three weeks he experimented with Gibson-Hill, where he worked on the overhead wire system of electrification and groaned under the tongue-twisting title of senior hanger computation expert. Then came a shift to Otis Elevator, a better job but no glamorous title. Harold, however, claims that he will not follow Greg to Kearny.

The perpetrators of Course I's most famous thesis have both descended to Harvard. We refer to Kirk and Holmes. Bill is taking his second year of work in the Business School, and we hear from reliable sources that he is just as capable in business studies as he was in engineering. During the summer he worked for Lee Higginson in Boston, and this firm is anxious to again secure his services when he finishes at Harvard in June. Ed has been working with the Bureau of Public Roads, but obtained a leave of absence to do graduate work in traffic research at Harvard.

I bumped into Earl Crawford a couple of days ago in the Grand Central subway station. He had started work a few days previously in the bridge department of the New York Central Railroad. Until then he had been with the American Bridge Company and Jacoby, who started with him is still with that outfit. The New York Central has a big building program ahead, and Earl will undoubtedly get into some interesting work.

Some weeks ago Weinberg and I attended a meeting of the New York section of the A. S. C. E. The first person we met there was Cristofalo. Charlie is on a survey job at Mt. Kisco and lives at home in Pleasantville. He is, however, rather desirous of getting a job here in the city, even though it will force him to commute a considerable distance. From Cristy we learned that Walt Hodder is still in town working for the subways. His address is 172 West 77th Street.

A letter from Jim Donovan X informs us that Kent Hough has returned from Guatemala. This news reached us early in November, and we have no further details. — A recent newspaper article carried the information that Des Shipley was one of a class graduating from a flying course at Kelly Field. If my memory is correct he was about to start an additional six months of training at another Texas field. — Early last summer McCarthy went to Baltimore and started work with the Berliner-Joyce Company designing airplanes. Several circumstances caused Mac to give up that job and he is now in Boston again working with the Boston and Maine.

That brings my news up to date. Letters, especially from those heard from only once or not at all since graduation, are always in great demand. How about it? — GEORGE P. PALO, Secretary, 143 East 39th Street, New York, N. Y.

1929

Not many of the Course Secretaries have become active as yet, but those who have are quoted in this issue. It might be of some assistance to those concerned to know that notes to get in an issue must be sent in so that they can be forwarded to The Review Office before the twenty-fifth of the month previous to the date of issue. For instance, the November issue came out on the twenty-eighth of October and material had to be in by the twenty-fifth of September. That is the usual schedule maintained. Everybody should try to get his notes in so that notes will be as nearly up to date as possible. Any '29 men who cannot get in touch with their Course Secretaries can get information and news in The Review by writing directly to the General Secretary.

According to the news which has penetrated away out here to Akron, Neil Ross has recently joined the rapidly increasing number of Benedicks of the Class of '29. Rudy Swan followed him by almost two weeks, but went just as far. Hearty congratulations to you both, and I hope you enjoy such a life of happiness as I have for the past several months. According to other bits of information floating around, several others of '29 are contemplating the same step. Be sure to let us know so that we can wish you well. Joel Whitney is enjoying the Southern atmosphere which surrounds Nashville, Tenn., just as much as he does his work down there, and that is saying a great deal. When Joel signed with duPont he just prayed that they would have a man-sized opening in their organization for

1929 Continued

him in the southland. You know how big these Yankee lads go with these sweet Southern belles. Imagine it! He says he spends most of his time working and on the golf links. Read between the lines and you will see what a success he really is. He says his company does not allow the new men to have apartments, too.

Franklin Lammers of Course X was recently located in Chicago with the J. W. Murphy electric meter people. His work is on boilers, that is, on flue gas and so forth! — Jess Jessup of T. C. A. fame writes that Leominster, Mass., is going to be the scene of a great opportunity for him with the duPont Co. He is enjoying his work and adds that prospects look bright with million dollar plant additions under construction. Here's hoping that all the information I could gather for him on Goodyear belting will aid him to make a name for himself.

Of the gang out here in Akron only two are not assigned to permanent sections as yet. Johnny Hartz and Gene Gilman still have another month or so of training to undergo before securing permanent assignments. The Course II men have been on permanent assignments for about two months now, and are in the process of finding out what the rubber game is all about. Hal Dick went into the mechanical goods development end, and is busy right now assisting in the compilation of a new handbook. Hank Gibbons decided that Professor Haven had trained him well, and he was going to burn up the world as a machine designer for Goodyear. Ray Delano and myself decided that the development department was our field of opportunity, hence we are now enlisted in the ranks as embryo tire designers. All of us like the work very well. It brings us into close contact with Technology men who have come out in past years. Hank is working with Art Nichols '28, while Ray had Larry Coffin '27 as a boss until recently. In my section there is only one Technology man, John Oakley '26, who is designing airplane tires of the Airwheel variety.

Arthur Marsh writes that he is enjoying his work with the Carrier Air Conditioning Company of Newark. He, too, has been taking a training course which will be over by the time this is printed. Although he has no other Technology men in his training class, he adds that there are other recent graduates of Technology with the company so that he is not entirely alone. According to his letter he ran into the same sort of competition as we did here in Akron with a training course composed of graduates of all the leading technical schools from Georgia Tech to California Institute of Technology.

Now do not procrastinate longer. Send that letter in immediately and let us all hear from you and those with whom you have contacted. This column could contain a lot more news if you would get busy and send it in. — EARL W. GLEN, General Secretary, 339 Hillwood Drive, Akron, Ohio.

COURSE I

In spite of a complete lack of communications, I have been able to get indirectly the following bits of information regarding the activities of some of the boys. Bob Frierson is back with the Missouri Pacific Railroad working on a grade and line revision project at Allen, Kans. According to reports Bob is well pleased with his job. — Chuck Loo has returned home to the Hawaiian Islands, and can be reached through the McBryde Sugar Company, Elelee, Kauai, T. H. He is employed on the construction of a hydraulic fill dam. His particular task is to analyze and make field tests on the soils which go into the dam.

As you know, Hunter Rouse is in Germany studying hydraulics, and according to his letters he is making the most of his opportunities. He admits that he is experimenting with some other liquids besides water. — GORDON R. WILLIAMS, Secretary, 405 West Oak Street, Louisville, Ky.

COURSE XIV

As you probably know by this time, we have already lost one of our members by death. Sam Finn was drowned this summer while swimming in the Chesapeake Bay. He was accompanied at the time by Jimmy Spear. As Jimmy is now back at the Institute, Killian will be able to obtain an account of the drowning from him. I thought Killian had already obtained this story, but I did not see it mentioned among the deaths in the recent issue of The Review.

Jimmy Spear was at R. O. T. C. camp this summer and is now back at the Institute to finish up for his degree. Ray Mosher, Nathan Rosen, Nathan Promisel, and Alec Souden find it difficult to part from those "old gray walls" and have returned to the Institute for their Master's degrees. That is about all I know of the fellows in the Course except yours truly, who is eking out a living under the auspices of *Industrial Gas*.

At different times I have run into Carl Wood VI and Bill Wiley X on the great White Way. Just barely said "hello," and didn't talk to either one long enough to find out what they have been doing. I ran into Eric Bianchi at the Convention of the American Gas Association at Atlantic City in the middle of October. Eric is now assistant manager of the Baker's Supply Company in Cambridge, Mass. That's about all I know of the Class of '29.

Just a few remarks on fellows of other classes whom I have run into recently. George Freyermuth received his Master's degree in February, 1928, and was transferred from the Standard Oil Laboratories in Baton Rouge, La., and is now working for the same company in Elizabeth, N. J. Ken Smith '27 is designing for some construction company in Newark who builds equipment for handling coal. Ran into Cy Meagher a few days ago. He had just returned from the Army-Yale game and was wearing his roommate's fur coat and still in pretty much of a befuddled condition.

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George Houston has recently been married. Don't know who the lucky girl is. George is working with his father in Newark selling industrial real estate. Ran into George Hogan '27, I believe, at the A. G. A. Convention, Atlantic City. Hogan is one of the industrial engineers for the Public Service Electric and Gas Company of New Jersey.

I just happened to think of a few more items on our Class. Hugh Hamilton is working for some radio concern in Salem, and contemplates getting married in the near future. In fact so near that he probably will be by the time this next letter from you is printed. Bill Hutchinson is mining in Butte, Mont. I understand Bill struck it lucky. The job which he was supposed to have was filled by the time he arrived in Butte and he was put in a much better position than the one for which he was originally scheduled. According to Johnny Worcester, who was working in Butte this summer, Hutch is having a good time and making lots of money. What more could anybody ask? Curt McCune dropped in the office here about a month ago. He was trying to land a job with Hornblower and Weeks at their Wilkes-Barre office. I don't know whether he succeeded or not. — WILLIAM W. YOUNG, Secretary, *Industrial Gas*, 9 East 38th Street, New York, N. Y.

COURSE XV

When I received the last Technology Review and noted the scarcity of '29 news I thought it was high time I got onto my job and at least gave you what little dirt I have that would be of interest, so here goes.

Rogers XV along with King Cooper XV and two other boys who were not Technology men trekked across country last June, Rogers to his home at Long Beach and the rest of the party to parts unknown in a round-the-world trip. Whether Cooper is back yet or not I do not know. Rogers has located at Long Beach, having associated with the Merritt-Scott-Chapman Company. His big job, Rogers says, is to convince his new boss that he's as good as he thinks he is which is *some* job as I told him.

Friend Raymond Bray XV is also out on the coast along with Henry Dean XV, and both are with the Union Oil Company. I have not heard from them directly, but understand they like their new work, quarters, and so forth, immensely, and who wouldn't? Oil seemed to be the logical field for both Bray and Dean.

Nord XV, as usual a man who does things, went and took a wife just after graduation and then joined the New York Telephone Company and located in New York City. Saw him when I visited the big city this fall and found him happy, both with married life and in his new work. — Ray Underwood XV is back at the Institute this fall, not repeating 1.64 or EC 72, but this time as an embryo professor. He's the assistant in the Business Management Department. — In case you have not heard from your Course II Secretary, the same is to be said about Edward C. Roche except that he's

1929 Continued

assisting in the Sanitary Engineering Department. — Robert McClintic is out in Flint, Mich. I understand, with the Buick Motor Car Company. Don't know how he is doing, though, as I have not heard from him directly. This is a splendid opportunity for him to feature in these Course Notes by writing in what he is doing and any other news he knows.

As for yours truly, I am with the Electric Motor Repair Company of Springfield, Mass. I am rather a fair-sized frog in a small puddle which I like better than contrarywise. I am selling electrical equipment, especially motors and industrial heating equipment. I have been given every incentive to work, like the work and those for whom I work, so

everything is jake. — I didn't see any reference to the whereabouts or doings of one Earl Glen. How come?

Looks as if the boys are going to be rather slow in writing, so think I will get out a circular letter telling them to write, why and where. — ELMER SKONBERG, Secretary, Electric Motor Repair Company, 11 Park Street, Springfield, Mass.

Technology Club of Florida

RAYMOND CUSHMAN '16, although holding an important position in the Barnett National Bank at Jacksonville, Fla., is giving a great deal of his spare time to foster air-mindedness in Jacksonville and other parts of Florida. He is also President of the Reserve Officers Association.

George W. Simons, Jr. '15 has been appointed city planner of Jacksonville, and has been engaged for the last year in getting up a constructive scheme of city planning. The matter is now before the city officials, and is awaiting final approval. He is associated with almost every movement in the city that makes for progress. — Henry W. Dew '13 is associated with the Alfred DuPont Enterprises and is located in the Barnett Building.

Philip A. Devlin '10 is an accountant in the Barnett Building. He started out as an architect, but, fortunately for him, got into something less temperamental before these prosperous times overtook him. He is actively associated with the Little Theatre movement in Jacksonville, being Treasurer of the organization. — HENRIETTA C. DOZIER '99, Secretary, 321 Barnett Building, Jacksonville, Fla.

Detroit Technology Association

The Association opened the fall season with a general get-together on October 8 at the University Club. Plans for the coming meetings were discussed.

The regular November meeting was held on November 12. After dinner Mr. Del A. Smith, general manager of the Detroit Street Railways, gave a short and interesting talk concerning Detroit's transportation system. This was followed by an informal discussion. President Hine appointed a nominating committee to report at the next meeting. There were many new members present, and it is hoped that there will be an even larger number of both new and old members for our get-together in December. — GEORGE F. GOKEY '21, Secretary, 8100 East Jefferson Avenue, Detroit, Mich.

The Technology Club of Central Ohio

Our Club has established a scholarship in Aeronautical Engineering at the Institute and next year will send our first student from Central Ohio. Much effort has been put forth toward collecting the necessary funds and our bank account is growing encouragingly.

From time to time a small group of members has been getting together for luncheon, and the bunch has grown in enthusiasm until it has been decided to establish a definite official luncheon date on the second Wednesday of each month at twelve o'clock in the Pavilion Tea Room on the fifth floor of Lazarus's Department Store. All Technology men are welcome and a reservation is never necessary. — EDWIN M. WOODWARD '17, Secretary, 1272 Hope Avenue, Columbus, Ohio.

Technology Club of Northern Texas

Members of the Club held a dinner on November 3 at seven p.m., at the Dallas Athletic Club, after which the following officers were elected for the coming year: President: Frank L. Chase '90; Vice-President: Marvin M. Stetler '18; Secretary-Treasurer: G. H. T. Washburn '16; and Executive Committee: Lester A. Russell '01, Richard W. Peatross '14, and Count B. Capps '20. — G. H. THOMAS WASHBURN '16, Secretary, DeWitt and Washburn, 1228-29 Kirby Building, Dallas, Texas.

Technology Club of Albany

The meeting held at the University Club on the evening of November 21 was attended by the following men: Carl H. Anderson '27; W. H. Balch; Harlen M. Chapman '02; Elliott B. Davidson '24; G. P. Dunn, Harold W. Fitch '18; Harold F. Hedberg '20; Theodore Horton '94; George C. Myrick '25; Gerald Putnam '23; Burt R. Rickards '99; Alexander J. Rockicki '25; Edwin C. Schatz '23; William D. Scofield '23; B. L. Smith, Cornell '14; Elwyn E. Snyder '14; and Redmond E. Walsh, Jr. '28.

After the usual dinner in the breakfast room of the Club, the Treasurer's report was read. Since there was no further business to be transacted, the Chairman, Mr. Rickards, asked Mr. Horton to introduce the speaker, Mr. Benjamin L. Smith, Cornell '14, of the sanitary engineering firm of Whitman, Requardt, and Smith. This firm is in charge of the design and construction of a new water supply for the City of Albany, a project now nearing completion, and Mr. Smith's talk concerned this undertaking. He gave a very interesting and comprehensive discussion of the matter, reviewing the history of Albany's public water supply since its inception in 1802, and then describing the preliminary surveys of about twenty-five possible sources of water supply, and

giving the reasons for the final choice of the Hannacroix, Basic, and Katskill Creeks.

The talk was amplified with many interesting figures and details, and was illustrated comprehensively with lantern slides. The members were particularly impressed with the careful attention which has been given to details, and the thoroughness with which the problem has been studied and executed. At the end of the talk the speaker was bombarded with questions and finally was given a rising vote of thanks. — HAROLD F. HEDBERG '20, Secretary, 13 Fleetwood Avenue, Albany, N. Y.

The Technology Club of Cincinnati

The autumn season witnessed an increase in the attendance at the luncheons which the Club holds every Tuesday in the Hotel Havlin dining room. With an influx of new men into this vicinity the number of names now on the Club's roster totals 140. As no meeting or party was held during the summer, the officers fixed the date of Thursday, November 21, for an evening party that should make up for past deficiencies and also afford the new men their opportunity to meet a greater number of the local Alumni. The Cincinnati Club was the scene of the festivities which began with dinner at 6:30 in one of the special dining rooms, where thirty-one Alumni seated themselves around the T-shaped table.

It was to be an evening of no business and all play as announced by the President, Henry D. Loring '07. Therefore, or however, Stuart R. Miller '07, who attended the last meeting of the Alumni Council, was permitted to give vent to his pent-up feelings and recount the latest news from the Institute. Two recent graduates of '29, Dreyer and Carter, were also present to make for the fusion of the new Technology spirit with the old. By toss of coin the former was assigned the task of telling all about it. The President himself was in fine facetious vein so that a rather pleasant two hours were spent at the dinner table.

At eight-thirty the party turned to the bowling alleys of the Cincinnati Club, four of them having been reserved for that part of the evening through the machinations of a member, Spiehler '08. To bring out a real competitive spirit, the most proficient were offered prizes, these being two original sketches by Fred Garber '03 which the Secretary had begged from the artist and had framed. Two consolation prizes were also pre-

sented by the aforementioned Stuart Miller to the least proficient. These were closely wrapped packages, probably some Merrell Company preparation to relieve sore muscles. Gillett '19 and Hooker '97, in the order named, were high men; other names were charitably forgotten. Two hours of pleasant companionship and friendly rivalry brought the evening to a close. — WILLIAM V. SCHMIEDEKE '12, *Secretary*, Penker Construction Company, 1030 Summer Street, Cincinnati, Ohio.

Technology Club of Chicago

The activities of the Club are too many and varied to be reported in full. Tuesday luncheons at the Electric Club occur weekly and are well attended. At these, short addresses are given by Technology men, or men who have a topic interesting to Technology men. Some of the speakers have been Dr. Walter M. Scott of Yale, Lonsdale Green '87, S. H. Stix '91, Edward F. Miller '86, and Bradley P. Williams '21.

On October 30 a dinner in honor of Col. Frank L. Locke '86, who is Personnel Director of the Division of Industrial Cooperation and Research. This reception dinner was given at the Piccadilly Club, and as a special guest, William J. Bogan, superintendent of public schools, was present.

November 29 was selected as the date for a dinner to be given to Dr. Stratton at the University Club. This was a semi-formal occasion, and was well attended.

Present students residing in the Chicago district are now junior members of the Club. New headquarters are now at the Brevoort Hotel. Club luncheons are served on week days and transient Technology men are always welcome.

In December Dr. James L. Tryon, Chairman of the Faculty Committee on Admissions, was in Chicago for several days. He interviewed prospective students for the Institute and their parents while he was here. — C. LAUREN MALTBY '22, *Secretary*, 38 South Dearborn Street, Chicago, Ill.

Washington Society of the M. I. T.

The regular monthly speaker luncheon of the Society was held at the University Club on Friday, November 22. Dr. R. R. Sayers, chief of the health and safety branch of the Bureau of Mines, gave an interesting talk on safety and health work in coal and other mines, mining camps and smelters, whereby the mortality of these hazardous occupations has been greatly reduced. There was some discussion regarding the proposed visits of the Technology Musical Clubs and the Tech Show to Washington next February, and the matter was referred to a special committee. Members present included President Alfred E. Hansen '14, Commissioner Proctor L. Dougherty '97, Walter L. Cook '03, Walter C. Dean '00, Lawrence A. Foster '27, Amasa M. Holcombe '04, Allen B. McDaniel '01, Henry C. Morris '00, Frederick H. Newell '85, William E. Parker '99, Stanley C. Sears '01, Ferdinand T. Schneider '92, Walter I. Swanton '93, Francis G. Wells '22, and the Secretary.

The Secretary has received a letter from Frederick W. Swanton '90 in which he states that the report of his death which appeared in the November Review was "greatly exaggerated." — KENNETH P. ARMSTRONG '10, *Secretary*, 2002 Rhode Island Avenue, N. E., Washington, D. C.

New Haven County Technology Club

On Wednesday, December 4, the Club gave an illustrated lecture for its members at the Sterling Chemistry Laboratory. The lecturer was Kent T. Healy '23, Assistant Professor of Transportation at Yale University who chose "English Railways" as his subject. He is the author of a recently published book, "Electrification of Steam Railroads," and spent last summer in England studying their railways. The Committee in charge were: Philip G. Laurson '10; Barnett F. Dodge '17; and Walter R. Weeks '24. — WALTER R. WEEKS '24, *Secretary*, 178 Willard Street, New Haven, Conn.

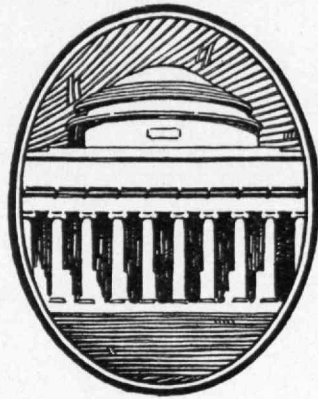
Technology Club of Hawaii

Hawaii's engineers were all agog the morning of October 16, when the S. S. *President Jackson* and S. S. *Korea Maru* steamed into Honolulu Harbor one hour ahead of schedule bearing 150 famous engineers on their way to attend the World Engineering Congress in Tokio. For two days guests studied local geography, surf board phenomena, and the mechanism of the hula.

Twenty local Technology hosts had the privilege and pleasure of meeting at a farewell luncheon twenty Alumni and professors — the largest and most distinguished group to ever visit our fair shores. The oldest Class present was represented by our beloved Professor Robert H. Richards '68, the youngest by Harrison L. Jewett '31. Our distinguished guests were: Professor Robert H. Richards '68, Professor D. C. Jackson, Wilfred Lewis '75, John R. Freeman '76, Charles T. Main '76, H. D. Hibbard '77, Professor George K. Burgess '86, Allen Hazen '88, Calvin W. Rice '90, George W. Fuller '90, William R. Kales '92, Walter M. Newkirk '92, Professor Charles E. Locke '96, Dr. Frank B. Jewett '03, Oscar G. Thurlow '04, O. C. Merrill '05, Henry A. Wentworth '05, Professor Harold E. Babbitt '11, Maurice Holland '16, and Harrison L. Jewett '31.

George W. Fuller '90 was borrowed by the Chamber of Commerce together with Elmer A. Sperry to speak at their luncheon held elsewhere at the same time. The hosts were: Professor Carl B. Andrews '28, Lyman H. Bigelow '01, Sidney T. Carr '06, Capt. L. L. Clayton, U. S. A., C. W. Dickey '94, Lt. W. R. Dowd, U. S. N., Comdr. F. M. Earle, U. S. N. '20, Harry P. Field '21, Lt. John B. Franks, William C. Furer '06, Lawrence N. Gruelle, Ralph B. Johnson '27, Capt. Clarence B. Lober, U. S. A., Lawrence S. McLane '23, Charles M. Perkins '29, Dudley W. Smith '28, Robert S. Thurston '11, Norman K. Watkins '98, Lt. C. D. Wheelock, U. S. N., and Col. F. W. Phisterer. — HARRY P. FIELD '21, *Secretary*, P. O. Box 2750, Honolulu, T. H.





INFORMATION

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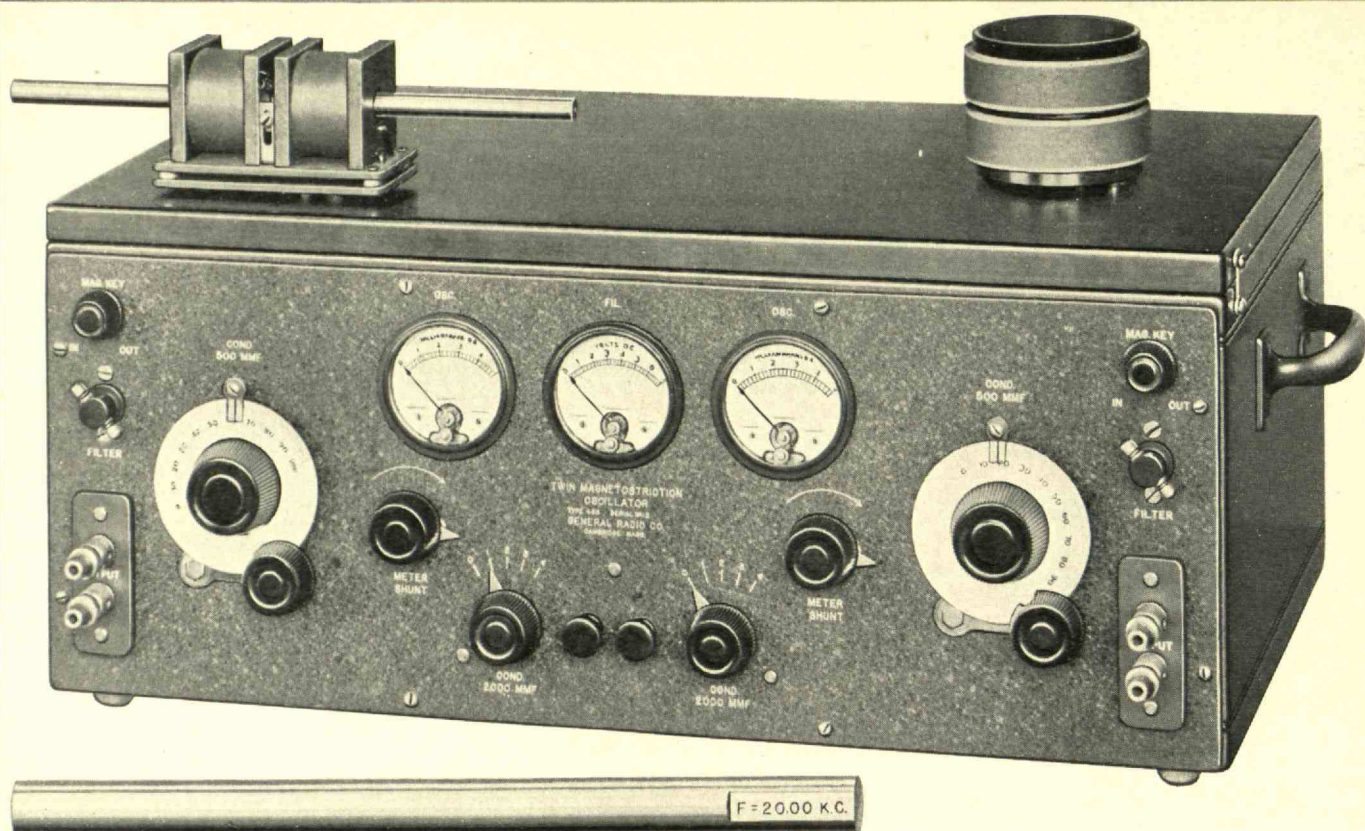
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